HOW WE ARE FED

CHAMBERS'S

HOW WE ARE FED

HOME AND WORLD SERIES

BY

JAMES FRANKLIN CHAMBERLAIN

HOW WE ARE FED

HOW WE ARE CLOTHED

HOW WE ARE SHELTERED

HOW WE TRAVEL

HOME AND WORLD SERIES

HOW WE ARE FED

A GEOGRAPHICAL READER

BY

JAMES FRANKLIN CHAMBERLAIN, Ed.B., S.B.
FORMERLY PRESIDENT STATE NORMAL SCHOOL, SILVER CITY, NEW MEXICO; CHAIRMAN DEPARTMENT OF GEOGRAPHY UNIVERSITY OF CALIFORNIA, SOUTHERN BRANCH, LOS ANGELES

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PREFACE

In the ordinary course of events, most individuals take some part in the manifold industries which engage the mind and the hand of man, by which alone our present-day civilization can be maintained. These great world activities touch the daily life of *every* member of society, whether child or adult, worker or idler.

A chain of mutual dependence, too often unrecognized, binds together the members of the human family, whether they belong to the same community or dwell on opposite sides of the earth. The links of this chain are made up of the articles which constitute our daily food, our clothing, homes, fuel, light, and our means of communication and transportation; and only by continuous coöperation are they kept together.

The highest motive in education is to present the conditions which will lead to the most complete living; to build up the best possible members of society; to develop character. An individual who does not understand the life of which he finds himself a part, cannot be in full sympathy with its conditions and hence cannot be of the most service to himself or to others. Only to the extent that education and life follow the same general course, can each be truly successful. Far too little is done in our schools to acquaint children with their relations to the great industrial and social organi-

zation of which they are members. Even grown persons have, as a rule, a very superficial knowledge of these relations.

It is a recognized principle that our knowledge of geography has its foundation in our knowledge of the home. The natural connecting link between the immediate surroundings and the outside world is the *present daily life of the home*. Through the industries seen in the community, the commodities in general use, and the history of their creation and supply, the pupil acquires an insight into the life about him as well as into that of other parts of the world. He also realizes the great truth that the world and its people are in intimate touch with *him*. In this way he is led back and forth along the routes which civilization has followed in its progress, which it also follows to-day, as mankind clasp hands across oceans and continents. Thus the remote and abstract become immediate and concrete. Facts are seen in a setting of reason, and a logical and interesting basis for the study of physical, climatic, and human conditions is furnished.

This study begins with the commodities in constant use and finally encompasses the whole world, but always with the home as the base of operations. It creates a knowledge of the interdependence of individuals, communities, and nations, and a genuine respect for the work of the hands and for the worker. The importance of this respect is not likely to be overestimated. Without it a true democracy cannot long exist. The World War opened our eyes to our national extravagance. As a result, conservation was practised by old and young, rich and poor. The lessons learned must not be

forgotten. Children must be led to see that unless we continue to conserve, succeeding generations cannot enjoy the blessings which are ours.

Realizing that national habits of thrift and conservation must come through the teaching of children, and that the study of food, clothing, shelter, and transportation offers a most natural and interesting approach, the author has revised the books of the Home and World Series with this purpose in view.

Geography as a field for silent reading has been carefully considered in the revision of this and the other books of the series. Following each chapter there are questions designed to test the comprehension of the pupils. The rate of reading may be determined from time to time by having the children count the number of words read per minute.

No attempt has been made to treat every article of food. Those in most general use, as well as those which will best serve to develop a knowledge of geographical conditions and of man's relation to man, have been chosen.

A given industry is pursued in somewhat different ways in different places. It has not been thought wise to describe each modification in these pages. For example, the method of handling wheat in California is different from that employed in Minnesota. The value of the work will be increased if the teacher will bring out these points.

All places mentioned should be definitely located, both as to position on the map and globe and with reference to the home. When developed from the standpoint of direct, personal interest, a knowledge of the location of

places as well as of other facts mentioned is most likely to be retained.

The illustrations used have been very carefully selected because of their *teaching value*. They give a clearness to mental pictures which can be excelled only through observation of that which the illustrations symbolize. Much experience in the use of geographical illustrations has shown that pupils need to be directed in their examination of them. To secure the best results they must be made the centers of thought-developing questions.

Appreciating the reception which this volume has had at the hands of teachers and pupils and trusting that the revision will be of greater service, I submit it to my fellow teachers.

JAMES FRANKLIN CHAMBERLAIN.

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HOW WE ARE FED

THE PAST AND THE PRESENT

Long, long ago people did not live as we do to-day. Their homes were very different from ours, for they were made of the skins of wild animals, of the limbs and bark of trees, or of tall grasses. There were no stoves, chairs, tables, or beds in their houses. Instead of lamps, gas, or electricity, a fire on the dirt floor or in front of the house furnished the light.

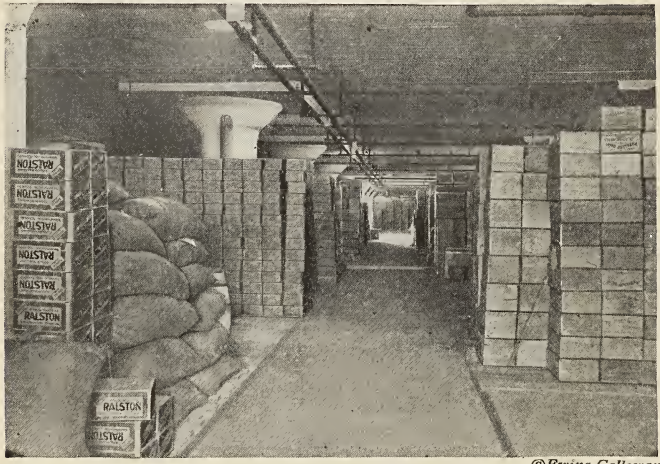
The clothing of these people was as simple as their homes. It was made of skins and furs in cold countries and in warm countries of braided grasses and the fibers of certain plants. You may be sure that tailors and dressmakers were not consulted as to the latest styles, for the styles did not change and there were neither tailors nor dressmakers to consult. Each family made its own clothing, and there was not a sewing machine to be found.

How would you like to use a bone for a needle? Sometimes, instead of sharpened bones, long thorns were used. The sinews of the deer, or of some other animal, usually furnished the thread.

When the people were in need of food, they went into the forest and gathered roots, nuts, and fruits. Wild animals were killed by means of such weapons as bows and arrows and spears, and fish were caught in the lakes and streams.

The food was not cooked as ours is; for, as I have

told you, there were no stoves. Sometimes the meat was broiled over the fire, sometimes baked in a hole filled with ashes and coals, but it was often eaten raw. It was not easy to have a variety of food, and there were times when it was very difficult to obtain anything. When food was abundant, the people feasted, and when it was scarce, they were often hungry. How



©*Ewing Galloway*

Civilized people plan ahead. They store large quantities of food for future use. Here you see food and other supplies stored in a modern warehouse.

would you like to wait for your breakfast while your father went to the woods or to the river in search of something to eat?

When the meals were prepared, they were not neatly served as yours are, but each person took his portion and sat on the ground while he ate it.

All of this seems very strange to you, I know. If you live in the city, you are accustomed to seeing the butcher, the baker, the milkman, and the grocer call every day. There are stores where people buy whatever they want to eat, drink, or wear. You wonder how anyone could live in such a way as I have described, but there *are* people who live in this fashion to-day, although you have never seen any of them. They are *uncivilized*. When people live in this way, it takes most of their time to provide themselves with the things that are necessary to life. They have little opportunity to improve their ways of living and of thinking.

Civilized people divide their work. Some provide food, some make clothing, some build houses, some furnish fuel, and some are engaged in carrying others from place to place. Each does his part. In this way, you see, they learn to do their work better, because each gives much time and thought to one kind of work. This plan gives each one time to study and to learn something about the world and its people. Think how much better our houses, our clothing, and our food are than are those of uncivilized people, and how many other advantages we have.

It is possible to live as we do, only when each one works for others as well as for himself. If anyone fails to do his part, the rest must suffer until some one is found to take his place. It is to prepare yourself to do *your part* in some useful work for others, that you are going to school day by day. You do not now know just what that work is to be, but I want you to remember that *all* honest work is noble. It is not so important *what*

work you do as it is that you should do your work *well.* No matter what your work may be, you can carry sunshine in your face and helpfulness in your heart. If you do this, you will be known and loved. Hard work, coarse clothes, and lack of money can never hide these things, neither will the finest of clothing cover a selfish or untruthful nature.

Let us look at this dinner table loaded with good things to eat and drink. There are bread, butter, meat, vegetables, milk, tea, fruits, and other things. You see at once that many persons must have worked to provide this food, for only a small part of the work was done in the kitchen. If these things could but speak, they might tell you stories as wonderful as fairy tales. They have been gathered here from the fertile plains of the West, from the sunny South, from Brazil, from the islands of the Pacific Ocean, from far-off China, and even from the waters of the sea.

How did the homes of the people of long ago differ from our homes?

How did the people of cold countries formerly dress?

Read aloud the paragraph that tells about needles and thread.

How did the people of the past secure their food?

Why did they eat so much uncooked food?

What advantage is there in dividing labor?

Read aloud the sentence that tells why you are going to school.

THE STORY OF A LOAF OF BREAD

In the dark granary of a farmer's barn in North Dakota once lived a modest family of grains of wheat. The bright, warm days of the summer time, during which they had been placed in this dark room, soon grew shorter and cooler. The swallows, whose mud nests were in the rafters overhead, told the wheat brothers that winter was coming, and then flew away to the balmy southland.

Soon biting winds and blinding snow came sweeping over the level land. Sometimes the farmhouse was almost hidden under the drifts, and the farmer had to shovel out a path to the barn, so that he could feed the horses and cattle. By and by the days grew warmer, the snow disappeared, and the birds returned one by one. The farmer and his men got out their plows and pulverizers, and prepared the soil for the seeds soon to be planted.

The wheat was now shoveled into sacks and taken to the fields. Here it was placed in great machines drawn by tractors, which scattered it evenly over the land and at the same time covered it with soft soil. The men whistled and sang as they worked, and blackbirds, bluebirds, and larks flew back and forth, singing and searching for bugs and worms, as well as for the shining kernels of wheat.

The wheat was not content to remain underground, but kept trying to push itself out into the world. One

Sowing Wheat on a Modern Wheat Farm

The front tractors pull plows. Then come disk plows that grind up the large pieces of earth. Last of all comes the drilling machine that sows the wheat.

night there came a warm shower, and the next morning what looked like tiny green blades of grass appeared all over the field.

All through the spring and summer the wheat kept growing, and finally there appeared at the ends of the stalks clusters of kernels, just like those which the

Here is a field of wheat "turning golden in the summer sunshine" of Colorado. How can you measure the height of the stalks?

farmer had planted. Some of these kernels had produced families of twenty or thirty. These clusters are called *heads*.

As the south wind passed over the field it brought the wheat messages from Minnesota, Iowa, Illinois, Indiana, and other states, telling of relatives who were

already turning golden in the summer sunshine. One day some of the kernels thought they heard a voice from California. Do you think they did?

The grain in some of the fields was called *winter wheat.* This was because the grain had been sown the autumn before, and had remained in the ground all

Flour Mills of the Pillsbury Flour Mills Company at Minneapolis

Point out the grain elevators.

winter, covered by a blanket of snow. Why was it sown in the fall? The wheat of which I am telling you was called by the farmer *spring wheat.*

Soon machines called *binders,* each drawn by several horses, appeared. They cut the waving grain, and

bound it up in bundles called *sheaves*. These were set up in double rows to dry, and afterward put into another machine which separated the kernels from the stalks, which were now called *straw*. This work the farmer calls *threshing*. See if you can find out how this used to be done.

In some parts of our country *combined harvesters* are used. These cut, thresh, and sack the grain. They are drawn by engines called *caterpillars*.

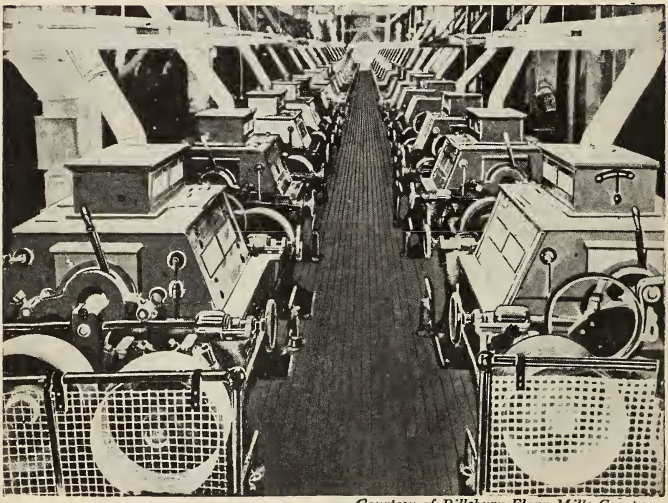
After the threshing, the wheat was put into sacks and taken to the nearest railroad station. Freight cars then carried it across the level prairies to the beautiful city of Minneapolis, built beside the Falls of St. Anthony. What river flows through this city? Of what use are the falls?

Here there are tall buildings called *elevators* in which the wheat was stored for a time. Before being put into the elevators it was examined and *graded*. As there was wheat from many farms it could not be kept separate, so each farmer was told how much he had, and how it graded.

Some time after this the wheat was taken to one of the great mills to be ground into flour. The largest of these mills manufactures about fifteen thousand barrels of flour every day. This is the largest flour mill in the world.

When the kernels reached the mill, they were put into machines called *separators*, to be separated from all companions, such as grass seed, mustard seed, and wild buckwheat. They were then placed in an iron box in which brushes were revolving rapidly, and were *scoured* to free them from fuzz and dirt. Those that were very dirty were washed.

The kernels were *steamed*, in order that the coating, called *bran*, might not break into small pieces. This is called *tempering*. The kernels now thought that their trials were over, but they were mistaken. Soon they found themselves being *crushed* between rollers. After they came out they were *sifted*, and then run between



Courtesy of Pillsbury Flour Mills Company

In these machines the wheat is ground. What use is made of the pipes?

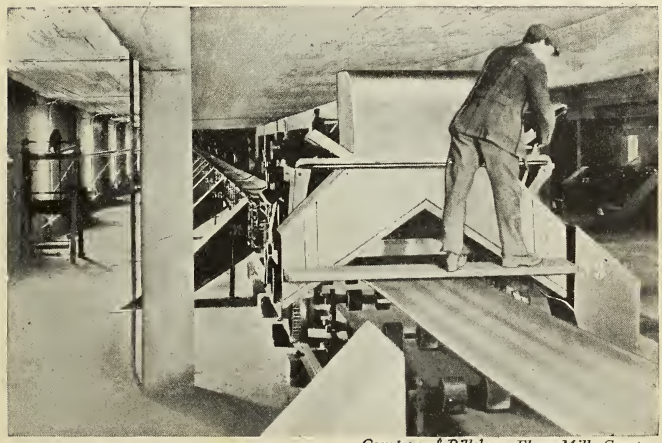
other rollers. This was repeated six times, and each time the flour was a little finer, for the rollers were closer together. The flour was then run through tubes of flannel. These took out whatever dust it contained. It was then ground still finer. The flour was then put

into sacks or barrels, which were marked for shipment to other parts of the country.

Only the wheat intended for the very best grade of flour is treated as carefully as this was.

What industry does the use of barrels bring in?

From the mills the flour was sent to many parts of the land to supply stores, bakeries, hotels, and homes.



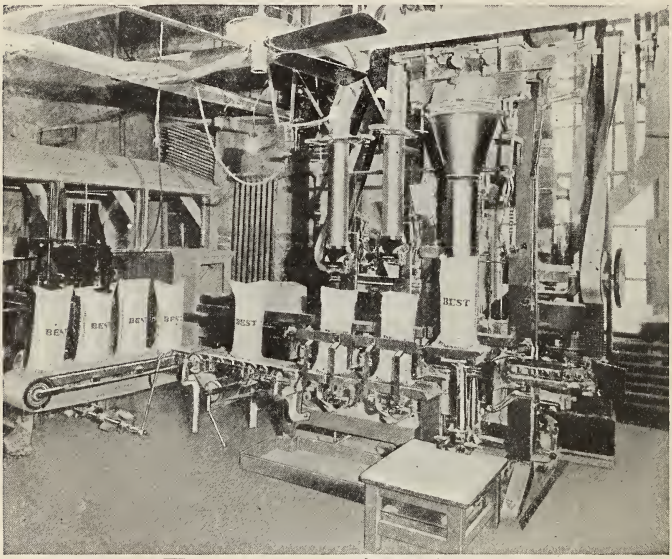
Courtesy of Pillsbury Flour Mills Company

In these machines the flour is sifted, or bolted.

Some of it found its way to the bakery near your home. The bakers, in their clean suits of white, weighed the flour which they were going to use, and then added a certain amount of water to it. Some yeast and salt were added also. This mixture they called *dough*. You have seen your mother mix or *knead* dough, I am sure. The bakers did not do the kneading with their

hands, but by means of machinery made for this purpose.

When the dough had been thoroughly kneaded it was left to *rise*. It is the yeast that causes the rising. This makes the bread light and spongy. It was then cut



Courtesy of Pillsbury Flour Mills Company

Tell what is happening to the flour in this picture.

into loaves and placed in the oven. The ovens in the bakery are very much larger than those in your kitchen stove, for many loaves are baked at once. When a nice shade of brown appeared on the loaves, the bakers took them out of the oven by means of long

shovels. Soon the delivery trucks came and were loaded with the fresh bread to be delivered to stores and homes. This loaf was just left at the door and is still warm.

So, you see, a loaf of bread has quite a history. I

Courtesy of Pillsbury Flour Mills Company

In a Large Bakery

The dough, in the center, has been cut into loaves and is ready to be baked in the large oven at the right.

have told you the life story of this one from the time of its grandparents, who were raised on the plains of North Dakota. Would it not be interesting to see each of the people who have had something to do with its production, and to make the journey which the

wheat and the flour made? You can do both in your thoughts.

We are not the only people who enjoy wheat bread. In most of the countries of the world it is highly prized. On this account bread is often called the "staff of life."

©Ewing Galloway

An Outdoor Baking Oven of a Kind in Common Use Many Years Ago

When my father was a boy he was often sent with wheat to the nearest mill. The miller ground the wheat and the flour was taken home and made into bread. In some parts of the world this custom is followed to-day. In our country the farmers sell their wheat and buy flour from the grocers.

Many people live in our cities and towns. These people cannot grow wheat. They depend upon others for their supply. Holland, Belgium, France, England, and some other countries are not able to produce enough wheat to meet their needs.

Are you wondering whether or not *we* depend upon other lands for this precious grain? Our country is one of the most important wheat producers of the world. We sell to others, but not so much as we once did.

This is because our population is rapidly increasing, and more of our people live in cities. Many, many trains would be required to carry enough bread to feed the people of the United States for one day.

A food so valuable as bread should never be wasted. When we waste bread we are wasting food much needed by others. This, of course, is wrong. Perhaps you have always been able to get a slice of bread when you were hungry. This is not true of all children or of all older persons. Every night in our own and in other lands there are people who go hungry to bed.

Children helped win the World War by saving bread and other kinds of food. We need to save in time of peace as well as in time of war. For many years we have been wasting large quantities of bread. Our country calls upon each one of us to help in preventing waste. A person who helps his country is a patriot. One way to be patriotic is to save bread. Will you be a patriotic soldier in the Conservation Army?

Can you have plenty of bread to eat and yet save one slice each week? If *you* can do this, many other boys and girls can do the same. If every person in our country will do this, there will be train loads of bread saved every year.

When you are not certain that you want a whole slice of bread, ask your mother to give you half a slice. If you find that you need more you can eat the other half. If you carry your luncheon to school and have bread left, do not throw it away. Share it with some one who needs it, or take it home.

Bread should not be thrown away because it is dry. Your mother will make bread pudding of it. Dry

bread and crusts may be cut up into little cubes and eaten with broth and soup. When your mother makes brown bread she will pulverize dry white bread and soak it. This she will mix with graham flour. Dried biscuits can be used in the same way. In this way much bread can be saved.

I am sure that you will do your best to prevent waste of bread. No one else can do *your* part. The Conservation Army will not be complete unless you enlist as one of its faithful soldiers.

Describe the winters in North Dakota.

How did the farmer prepare his soil for the wheat?

Read aloud the sentence that tells why some of the wheat was called winter wheat.

What is wheat called after it has been ground?

Tell how wheat is ground.

What makes bread light and spongy?

Tell how the Conservation Army can save bread.

HOW OUR MEAT IS SUPPLIED

Ramon lives in a plain, one-story house, built in the shade of some cottonwood trees that fringe each side of a small river in the eastern part of Colorado. A wide veranda extends entirely around the house, but there are very few flowers and no lawn. I am afraid you would not think it a very pleasant place for a home.

Not far from the *ranch house*, as it is called, are the barn and the *corrals*. A corral is a yard with a strong, high fence about it, in which cattle or horses may be placed. On the bottom land beside the stream, there is a corn and an alfalfa patch, besides one containing some potatoes and garden vegetables.

During most of the year the stream is quite shallow, and flows quietly over its bed; but when heavy rains occur it rises rapidly, spreading over much of the bottom land and carrying so much clay with it that it is almost the color of coffee.

Except along the river, not a tree is in sight from Ramon's home, and it is many miles to the nearest house. For hundreds of miles both north and south, there stretches a vast plain. Little is to be seen but sand, grass, and sagebrush. I had almost forgotten the prairie dogs, which scamper across the plain or sit up straight and motionless on a little mound of sand beside their burrows. They watch you closely, not

moving unless they regard you as a dangerous creature, when, quick as a flash, they disappear.

The rainfall is very slight in this part of the country, being less than twenty inches a year. On this account little attention is paid to farming, but instead the ranchers own great herds of cattle as well as many horses. Ramon's father is one of the *cattle men* of Colorado. He owns more than five thousand head of cattle, and some of the cattle men own twice that number. Of course such great herds of cattle must have much land to graze on. Some of the land is owned by the Government and anyone may rent it. Generally fences are far apart. These great pastures are called *ranges*.

Ramon's life is not much like yours. His home is far from schools, churches, stores, or railroads. He seldom sees strangers, but he enjoys long rides on his own pony, *Prince*. Sometimes he goes with his father and at other times he takes a gallop with one of the *cowboys* who herd the cattle.

The cowboys almost live in the saddle. They are out in all kinds of weather and are not boys at all, but strong, hardy men. They wear broad-brimmed hats, and carry long ropes called *lassos* or *lariats*, with which they catch the cattle.

Where there are so many herds they sometimes get mixed up. On this account each cattleman marks or *brands* his animals. These brands may be the initial letters of the owner's name, or they may be in the form of a horseshoe, a cross, a circle, or a crescent.

Each spring and fall the cowboys gather the cattle together. This is called *rounding up* the cattle. They

Courtesy of Swift and Company

A Cattle Ranch of a Kind That Is Becoming Less Common Every Year

More cattle are now being raised on ordinary farms. What is in these wagons?

are then counted and the calves born since the last round-up are branded. In the fall, in addition to this work, animals are selected for the market. Why is the fall a better time for this selection than the spring?

The cowboys, mounted upon their swift, strong ponies, single out the animals that have never been branded, and, swinging their lassos over their heads, they throw them with such skill that the loop settles over the head or about the leg of the one wanted. As soon as the rope tightens, the pony braces its forefeet firmly and the animal is finally thrown to the ground. It is then branded with a hot iron and allowed to go. Ramon used to feel very sorry for them until his father explained that it hurt them very little, for only the skin was burned.

Year by year government land is purchased and therefore there is less land left for cattle to range freely upon. As population increases, the large ranches are divided and more of them are fenced. To-day great numbers of cattle are raised in many states on fenced farms of moderate size. The animals on such farms are usually of high grade.

On these farms the cattle do not depend upon wild grass for a living. Their feed is obtained from good pastures, chiefly fields of alfalfa and other hay and grain. Of course the cattle do not need to be herded by cowboys, because the animals cannot wander away unless fences are broken. As this occasionally happens, the owners of some fenced farms brand their cattle. Most of the small cattle farms are in well-settled parts of our country where conditions are very different from those where our friend Ramon lives.

Sometimes the cattle selected to be sold are not quite fat enough for the market. They are then taken farther east into the *corn belt* and fed for a time.

When they are shipped directly from the range to the market, they are driven to the nearest railroad and put into yards beside the track. They are then made to walk up an incline with high railings ending at the open doors of a cattle car. The animals are arranged so that the first faces one side of the car, the second the other, and so on. This is done so that the cattle cannot hook one another, and also that they may be fed and watered on the way, from long iron troughs which are fastened to each side of the car.

The great cattle markets of the United States are in or near Omaha, Kansas City, Chicago, St. Louis, St. Joseph, Sioux City, St. Paul, Buffalo, and Denver. Locate these cities.

One day when Ramon was about fourteen years old, his father told him that he was going to take a train-load of cattle to Chicago and that he might go with him. It was a happy time for Ramon, you may be sure, for he was very anxious to see some of the wonderful sights his father had told him about.

At last the day when they were to start on their journey arrived. The afternoon before, the cowboys had driven the cattle to the railroad so as to load them early in the morning. Soon after breakfast Ramon kissed his mother and his little sister good-by, and he and his father rode off across the level plain.

Finding the cattle already loaded in the cars, Ramon and his father were soon seated in the *caboose*, rolling over the miles of railroad which connected them with

Chicago. Whenever the train stopped for a few minutes, they took a long stick and went from car to car making the cattle that had lain down get up, so that they might not be injured by the others.

When bedtime came, they made their beds on the benches along each side of the caboose; these are cov-

Feeding Cattle in the Cattle Pens at Phoenix, Arizona

Where have these cattle come from, and where are they going?

ered with cushions. As they had brought blankets with them, they were fairly comfortable.

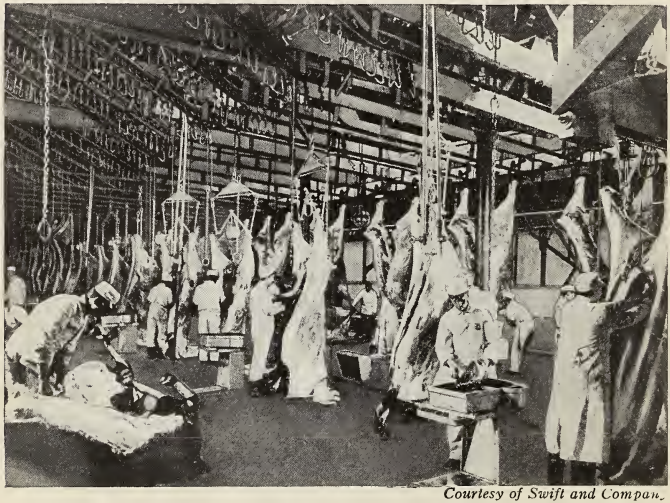
Ramon did not sleep very soundly the first night. The engine shrieked from time to time, and the car

A General View of the Chicago Stock Yards

Describe what you see as fully as you can.

rocked and jolted so that he was afraid of falling from his bed.

The next day they reached a part of the country where great cornfields waved in the breeze. The leaves had already turned brown, and golden ears of grain peeped out from the ends of the husks. There were



Courtesy of Swift and Company

Dressing Beef at the Stock Yards

What is meant by "dressing" meat? After the carcasses are dressed, they are removed to what rooms?

stubble fields, too, where wheat and oats had been harvested.

The country became more thickly settled as they went on, and the towns were nearer together. Streams

were more numerous, and grass and timber more abundant. The young traveler wondered why this was so. Can you tell?

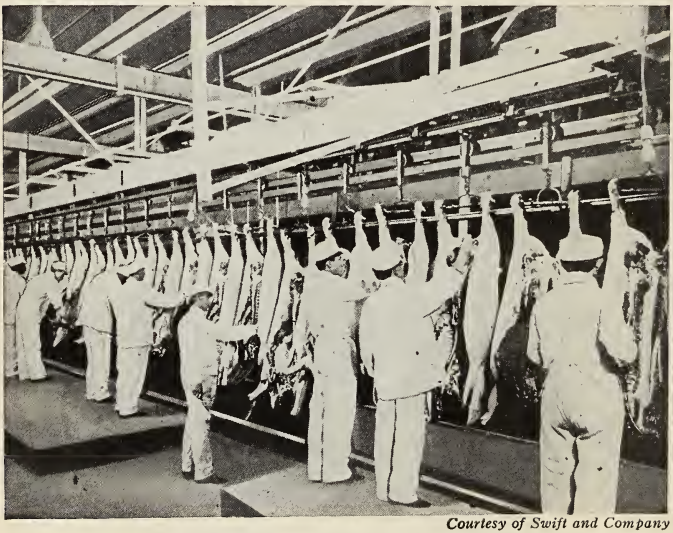
Early in the morning of the fourth day the train reached Chicago. After much switching and backing the cars were run into the Union Stock Yards, and the cattle were unloaded.

Courtesy of Swift and Company

Cooling Beef at a Large Packing House

Ramon was thoroughly bewildered by what he saw and heard. Men were shouting and cracking whips, others were riding up and down the alleys that separate the yards, turning the animals this way and that, gates were swinging back and forth, and there seemed to be excitement everywhere.

The cattle were weighed and examined to see if they had any disease, and were then placed in charge of a *commission merchant* to be sold. Buyers come to the yards and bargain with these commission merchants. When an unusually large number of cattle come in, the prices are likely to fall; when few arrive, the prices rise.



Courtesy of Swift and Company

Splitting the Backbones of Hogs at a Packing House

When the cattle had been yarded, Ramon's father said that they would go and have breakfast. In the afternoon they visited the *yards* and the slaughter and packing houses. The yards cover about a square mile of territory. They are divided into countless pens or

small yards, containing sheds, feeding racks, and watering troughs.

Ramon asked how many cattle were unloaded in these yards daily. His father handed him a copy of the Live Stock Report, and at the top of the first column

Courtesy of Swift and Company

Cutting Pork at a Packing House

he read that on the day previous there had been received 30,952 cattle, 31,030 hogs, and 37,192 sheep. He was told that sometimes the receipts are much larger than this and sometimes not so large.

They followed the bodies of the cattle from the

slaughterhouses, where they are dressed, into the *cooling rooms*. These are simply great refrigerators. Wagons come to the cooling rooms and haul loads of the meat to butcher shops, hotels, and depots. Within a few hours it finds its way to smaller cities and towns in all directions. A great deal of meat is shipped even to Europe. Why does not Europe produce its own meat?

When the meat has thoroughly hardened in the cooling rooms, it is sent to the *curing rooms*, where it is cut up and packed. Each person here does his particular work from morning until night.

Ramon learned, to his surprise, that every part of the animal is used. Hair, hide, horns, hoofs, teeth, bones, and even blood, are made use of.

Most of the hogs which enter the great meat-packing cities are raised in the corn belt.

The sheep need much pasturage, so the largest flocks are found in the western and southwestern states. A single herder may take care of several thousand sheep. His faithful companions and helpers are intelligent shepherd dogs. After a great flock of sheep has fed on an area, hardly a green thing is left. The people in the part of the West where there is little rainfall object to the pasturing of sheep around the headwaters of streams, because when the vegetation is removed the water runs off too quickly.

In the evening our friends watched the men, women, and children march out of the yards. They were told that not fewer than fifty-five thousand persons were employed in the various establishments. There are but three cities in Colorado which contain so many people.

While reading an evening paper, Ramon's father saw a

Courtesy of Swift and Company

Stuffing Sausage

Describe the process as you see it in the picture.

notice of a lecture to be given that night. The subject was "Wasting and Saving Meat." Our friends thought that this would be interesting, so they decided to attend.

Among the persons who had gathered to hear the lecture there were many boys and girls. The speaker explained that large herds of cattle and sheep cannot get all of their food from pastures in regions where the population is dense. Ramon saw great numbers of cattle in Nebraska, Iowa, and Illinois, but the herds were smaller and they had hay and corn in addition to grass.

"A few years ago meat was one of our chief exports," said the lecturer. "The amount sold is steadily decreasing and we import some from South American countries." The audience learned that the causes of this are our rapid increase in population and the increased use of meat per person.

The lecturer showed that meat is wasted in hotels, restaurants, and homes. He said that in many cases too large pieces are served. "If we take a large piece and eat only a part of it, the remainder may be wasted," he said. He showed that in the homes there need be no waste. Unused meat may be served in other ways, and bones should be used in making soup.

"There is in meat a substance called *protein*," said the speaker. "This helps to keep the body warm. It also furnishes *nitrogen*, which is needed in the growth and the repair of the body." Ramon was surprised to learn that this same element is found in dried peas and beans, nuts, fish, milk, eggs, and poultry. He learned that eating more of these foods will save meat.

"Boys and girls," continued the lecturer, "can be of great help by raising poultry. Poultry can be raised

in small cities as well as in the country. Send to our Department of Agriculture, Washington, D. C., for Farmers' Bulletin 1040. It contains valuable information on poultry raising." Ramon made a note of this, and when he reached home he sent for the Bulletin.

"We eat more meat than we need," continued the lecturer, "and this is wasting meat." He showed that it is not only a waste of meat, but a waste of labor as well. Do you see how this is? "Can each one of you save one ounce of meat per month?" inquired the speaker. Ramon thought this a very small amount. He was therefore astonished by what he next heard. "If every person in the United States will save this amount each month, the total monthly saving will be more than 3,000 tons."

The lecturer closed with a message to school children. "Millions of girls and boys helped to win the World War by saving meat and other foods," he said. "Your country needs you now just as it did then. It wants you to organize in every school a division of the National Conservation Army. This army is to serve its country by helping to prevent waste of every kind."

On the wall map locate the state in which Ramon lives.
Describe Ramon's home.
What is a corral?
What have you learned about the stream?
Why are there no forests in eastern Colorado?
How are cattle branded, and why are they branded?
On the blackboard make a diagram showing how the cattle are arranged in the cars.
Describe the Union Stock Yards in Chicago.
On the wall map locate the other important cattle markets.
Tell how meat can be saved.

MARKET GARDENING

Think of the immense quantities of fruits and vegetables that are used daily on the tables of a great city such as New York or Chicago. As we travel up and down the streets of any great city, we see rows of buildings, sometimes built in solid blocks and sometimes a little distance apart. Some have trees and small lawns in front of them; others are without even this touch of nature. Nowhere, except in the outskirts do we find gardens.

The people who live in these houses depend upon others to furnish them with their vegetable food.

Now let us make some excursions into the region surrounding one of these cities. For miles and miles we see *truck farms*, or *market gardens*. The main business of those who live in these districts is to furnish food for the people of the city, so that the latter may devote their time to their various occupations.

We see growing potatoes, cabbages, tomatoes, beans, peas, squashes, turnips, onions, sweet corn, celery, melons, and many other things. Usually all of these will be found in one garden, but sometimes the farmer grows only a few kinds, or perhaps but one.

Market gardening is very common in Germany, Holland, Italy, China, and other densely populated countries. Therefore we often find people who have come from these countries to America engaged in this

business. Chinese and Japanese gardeners are seldom seen in the East, but on the Pacific coast they grow most of the vegetables used in the cities and towns.

In the early spring, before the ground is warm enough to make seeds grow, the gardener starts his plants in *hotbeds*. These are long wooden boxes, or frames, without bottoms, covered with glass. They are usually

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Hotbed Gardening

Explain how this contrivance helps the farmer to grow early vegetables.

placed on the south side of some building or high fence. The glass covers allow the warm sunshine to enter the beds freely, but they prevent the rapid escape of the heat. You see now why they are called hotbeds. They are like small greenhouses.

A Field of Summer Squash Raised for Market

What crop do you see at the right?

A little later in the spring the fields are thoroughly cultivated and the plants transplanted. Of course only the vegetables desired for the early market are started in this way. What advantage is there in having the vegetables ready for the market very early in the season?

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Pumpkins on a Truck Farm

Vegetable farming is not easy work, although it is a pleasure to see things grow day by day as you care for them and as nature supplies her sunshine and her rain. The fields must be cultivated almost constantly,

to keep the soil loose, as well as to remove the weeds. Much of the weeding has to be done by hand, which is tedious work.

We want our vegetables fresh every morning; and as the truck farms are at some distance from the city,

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Harvesting Potatoes on a Truck Farm

the farmer loads his auto-truck the night before. Of course much produce is sent to the cities on trains, but, where farmers live near enough to deliver it themselves, their crops are more profitable to them. Why?

Everything is put in readiness before dark; and

while others are still in bed, the farmer mounts his load and starts toward the sleeping city. I have often ridden ten or fifteen miles on such a load before the stars faded away.

It is a novel experience. At first the night seems strangely still, but soon you are able to distinguish

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Farm Products Ready to Be Hauled to Market

The building in the background is a farm warehouse.

many voices coming from various places. The frogs croak from the ponds by the roadside; crickets and locusts send their shrill notes from grass and tree; a night owl startles you by his dismal hoot; the lamps

of the fireflies gleam, then disappear only to shine out again a little farther on.

At last a faint glow appears in the eastern sky, which grows brighter and brighter until the shining face of the sun is pushed above the horizon. Do you not think such a ride would be very enjoyable?

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A City Fruit and Vegetable Market

In large cities space is so valuable that fruit and vegetables are often stored on the sidewalk outside of meat and grocery shops.

In the cities there are *market places* where produce from the country is taken. In Chicago there is a very busy street where much of the buying and selling is done. Here the buyers from hotels, restaurants, and stores, as well as the men who wish to peddle the

produce from house to house, go for their daily supplies. There are also commission merchants whose stores are on this street. They sell the produce for those who ship it to the city by train.

We go to the markets to get what we want each day, or the peddlers bring it to the door. You see how necessary it is to have special workers to supply us with the different kinds of food. We consider it very important that we should have vegetables and fruits fresh daily. The work of supplying us with this food is very important. Remember that those who till the soil are entitled to as great respect as are those who do not work with their hands. Contact with nature makes men and women better, and many of the noblest souls that the world has known have lived in the country and plowed, planted, and harvested the products of the soil.

If you live in the country some one must work to produce the vegetables eaten by the family. If you live in a city your parents must work to earn money with which to buy vegetables. You can help in this. Have a vegetable garden and take care of it yourself. The work will be a pleasure, and you will have the added joy of knowing that you are helping to support the family.

A very small plot of ground will produce considerable food if properly managed. If there is no unused land on your lot perhaps you can join with other children and secure permission to work a vacant lot near your home. Your teacher of agriculture will tell you what to do and how to do it.

During the war children produced a large amount of food by cultivating gardens. Many, in addition to

helping their families, earned money for themselves. The "soldiers of the soil" are needed to-day just as they were during the war. The growing of vegetables is a very valuable part of the work of conservation. Will *you* help?

What do we mean by the outskirts of a city?

Why are truck farms and market gardens found near our large cities?

Name some of the things grown on truck farms.

What people do a large part of the gardening on our Pacific coast?

Read aloud the paragraph describing hotbeds.

Why are hotbeds hot?

Why is market gardening tiresome work?

Why is it important work?

DAIRY PRODUCTS

Uncle Ben lives on a dairy farm in the western part of New York State. It is a beautiful rolling country with cultivated fields, woodland, and pastures, and here and there a sparkling stream winding its way

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Here are eleven Holstein cows that have been chosen for their large yield of milk. Dairy cattle, for the production of milk, are of different breeds from beef cattle.

through the lowlands. The farmhouses are large and well built, and are surrounded by grand old maple, beech, and elm trees. Most of the barns are painted red with white trimmings.

There are many dairy farms in the neighborhood. Some of the farmers send their milk to the towns to be

Dairy Cattle in a Sanitary Barn

Modern dairy barns have many devices to keep the cattle clean and the milk pure and safe.

used directly, some sell it to creameries, and some to cheese factories.

Last summer I spent my vacation on Uncle Ben's farm, and Cousin Frank and I had happy times, you may be sure.

Every day, just before sundown, we went to the

pasture for the cows. There were about twenty-five of them, and they always seemed perfectly contented after the long day of feasting on rich grass and clover.

After we drove them into the barnyard Uncle Ben helped us fasten them in their *stanchions* in the barn. Then the men brought the bright pails and cans to

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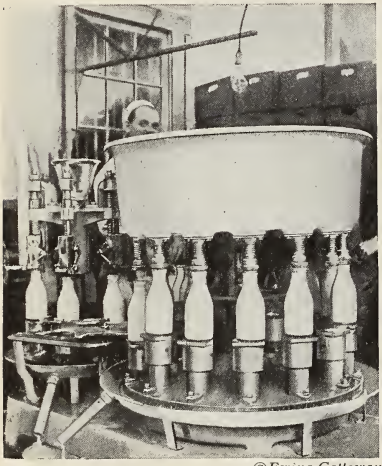
Loading Milk on a Milk Train

begin milking. Cousin Frank and I always helped, although he can milk much faster than I. Some of the cows gave but two or three quarts, while others gave as many gallons.

We strained the milk into cans holding eight gallons each, and put them into tanks of water to cool. After

milking was finished we turned the cattle into the barnyard for the night. On the dairy farm adjoining that owned by Uncle Ben the cows are milked by means of *milking machines.*

In the morning we commenced milking about sunrise. After breakfast the cans were loaded into the auto-truck and Uncle Ben drove to the station. Here they were put on the *milk train,* which took them to the city.



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Bottling Milk at a Dairy

The bottles are filled and capped by machinery.

Many other people sent milk on this same train. It was sent to bakeries, to hotels and restaurants, and to milkmen, who delivered it from house to house. Usually the milkmen put the milk into pint or quart bottles for people who like to have it in that form. Uncle Ben told us that much of the milk that is sent to New York City is bottled before it is sent. The bottling is done by machinery. He also told us that, because of the importance of having pure milk, there are, in all cities, inspectors who carefully examine the milk and report on it to the Board of Health. The

cows also are inspected, and if any are sick, they are usually killed.

Tiny organisms called *bacteria* find their way into milk, and unless their action is prevented the milk will sour. Pasteur, a French scientist, discovered a remedy. This consists in heating milk to a temperature of about 150° F., holding it at that temperature for twenty minutes, and then allowing it to cool rapidly. The process is called *pasteurizing.*

Each evening some one drove to the station again to get empty cans which the milk train had brought home. These were always carefully washed in hot water before being used again.

How does western New York State differ from eastern Colorado?

What work did Frank and his cousin do on the dairy farm?

In what two ways is milking done?

Why is much milk shipped on special milk trains?

Tell how and why milk is pasteurized.

Why are there milk inspectors in the cities?

BUTTER MAKING

One day, after I had been on the farm about a week, Uncle Ben took Frank and me to the *creamery*. A creamery is a place where the milk and cream are separated and butter is made.

We found several autoloads of milk being unloaded. The milk was weighed as it was received, for it is sold by weight.

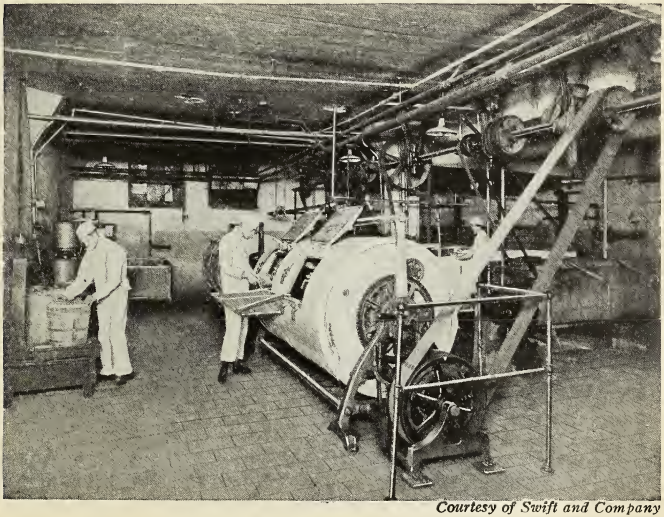
The milk was then strained into a large galvanized iron tub, from which a pipe carried it into a circular machine called the *separator*. The separator revolves rapidly, throwing the milk, which is heavier than the cream, to the outer edge, where it passes through small holes into a compartment by itself. The cream rises along the center and passes through another set of openings into a special compartment. A pipe carries it to a large vat, while another pipe conveys the milk to large tanks.

Uncle Ben told me that before the days of separators people used to wait for the cream to *rise* on the milk. The cream was then skimmed off, and the milk was called *skimmed milk*. Although the milk in the creamery is not skimmed, the same name is used for it.

I asked if the skimmed milk was used for anything. Uncle Ben gave me a cupful of it to drink. It was very good. He then told me that the separator takes out only the part needed in making butter, leaving all of

the sugar. I did not know before that milk contains sugar.

The farmers take home loads of this milk and feed it to their hogs. For each hundred pounds of milk delivered, they get back seventy-five pounds of skimmed milk, besides the pay for their cream.



Courtesy of Swift and Company

Churning Butter at a Large Dairy

Can you see how these churns work? How many are shown in the picture? What is in the tub at the left, and what is being done with it?

The creamery man told me that he made from four to six pounds of butter from one hundred pounds of milk.

The cream remains in the large vat about twenty-four hours before it is churned. The churn is a great

barrel made to revolve by machinery. It takes from thirty-five minutes to one hour to churn. The man told me that I might look at the book in which he kept the record of the churning. I saw that he made from two hundred fifty to six hundred pounds of butter at a churning. He said that some churns would produce more than one thousand pounds at a churning.

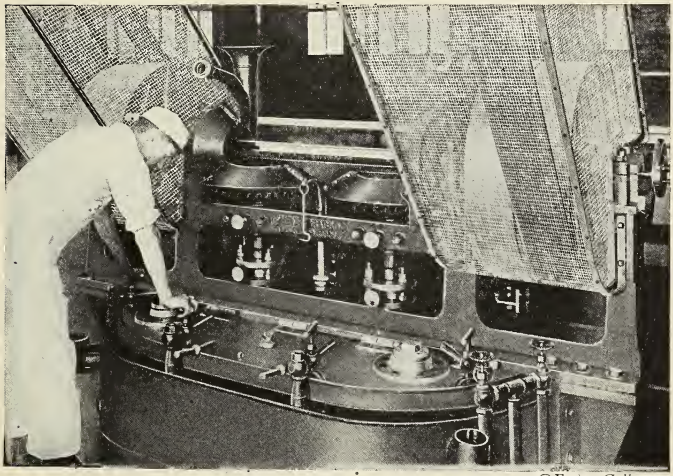
Not all of the cream is made into butter. There is left in the bottom of the churn a liquid called *buttermilk*. This is drawn off, and the butter is washed and *worked* before being taken out of the churn. The working is done by means of paddles in the churn. It continues for six or eight minutes and squeezes the liquid out of the butter.

While the butter is being worked, it is salted. Some of the butter is unsalted, but most of it is salted. When butter is made in the home, it must be churned by hand. Only a few pounds at a time can be made in this way.

When the butter was taken out of the churn, the men packed it solidly in wooden boxes about two feet square and four inches deep. The bottom of each box consisted of strips as wide as a *square* of butter. These were held together by a clamp, and the sides were hooked to the bottom and to one another. When the butter is to be cut into squares, these sides are removed and zinc ones take their places. In these there are slits running from top to bottom. Through these slits a wire saw is run, and so the butter is quickly cut into one or two pound squares. The butter is then wrapped in fancy papers upon which the name of the butter or of the creamery is stamped.

Of course some of the butter is packed in wooden tubs and shipped in that form. This butter is a little cheaper than that put up in squares.

The man told us that butter costs the average family several dollars each month, and that people who live in cities have to buy all that they use. "It is easy to



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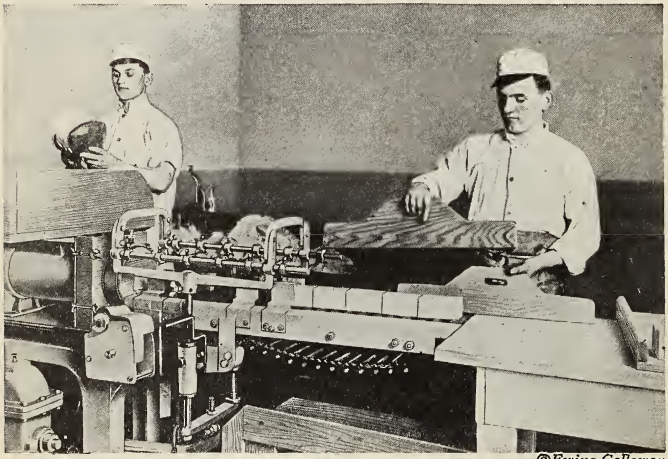
Making a Substitute for Butter

waste butter," said Uncle Ben. "Some people take more than they use. The butter that is left may be scraped into the garbage. Sometimes more butter than is needed is spread on the bread or is used on other food. The heat of the plates often melts the butter and this is another source of waste. The use of individual butter plates saves butter.

"Sometimes gravy instead of butter should be used on bread," said Uncle Ben. "In many cases cottolene, crisco, sueteen, or some other preparation should take the place of butter in cooking," he said. "The high cost of living is a burden to most people, and saving butter will somewhat reduce it."



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Oleomargarine, one of the substitutes for butter, is here being divided into brick-shaped "prints" and rolls.

Read aloud the sentence that tells what a creamery is.
What is the purpose of the separator?
How did people formerly take cream from the milk?
Why do many dairymen keep hogs?
Tell how churning is done.
Why is much butter sold in small packages?
How can butter be saved?

CHEESE

I was so much pleased with my visit to the creamery that Uncle Ben promised to show me how cheese is made. So one morning just after breakfast he, Cousin Frank, and I started out. After a pleasant ride of about five miles we reached the factory.

The first process here was the same as that at the creamery. After the milk was weighed it was run into great zinc-lined vats. There were four of these in the factory, each of which held about five thousand pounds.

Uncle Ben explained that the milk must *curdle* before cheese can be made. In order to make it curdle quickly, a little less than a pound of a substance called *rennet* was put into each vat.

A man worked at each vat with a long wooden rake, stirring the milk constantly. I saw a glass tube standing in the milk and asked what it was. Uncle Ben told me to look at it closely. I saw that it was a thermometer, and that it registered eighty degrees. A little while afterward I looked again, when it showed a temperature of ninety degrees. The milk is kept warm, so as to help it to curdle quickly.

In about an hour I could see the *curd* very plainly, but the men kept on stirring and cutting it. Presently one of them carried a piece of the curd to a table. He heated a small iron rod, and touched it with the curd. When he pulled the curd away, little threads were

drawn out to the length of half an inch or more. This he called the *acid test*, which showed that the curd was in the right condition to be made into cheese.

Of course only a part of the milk had turned into curd; the rest was *whey*, and was drawn off and run into tanks. Each man who had delivered milk to the factory was given a check for a certain number of pounds of the whey. It is fed to hogs. About two hours from the time that the milk was put into the vats, the whey was drawn off.

Curds at a Cheese Factory

One of the men now took a long knife and cut the curd into oblong cakes. These he frequently lifted and turned over. After this was continued for about twenty minutes, the pieces of curd were put into a small mill and placed on a board over the vat, and the curd was chopped into strips from one to six inches long and from one-half an inch to an inch thick. Salt

was scattered over the mass by one man, while another pitched it about with a three-pronged wooden fork. The man told me that he used three pounds of salt to each thousand pounds of milk.

Next, molds were filled with the curd and placed upon a table. A board, the same size as the opening, was now placed on top of each mold. Each mold was placed directly under a block which was fastened to a screw. By turning the screw the block was pressed against the top board, and so each frame of curd was pressed. I saw the whey running out as the squeezing went on. The superintendent told us that the curd would be left in the press until the next day.

Pressing the Whey Out of Cheese

We were then taken into the room where the cheese *ripens*. Here we saw large racks reaching nearly to the ceiling, filled with double rows of cheeses weighing from three to fifty pounds each. Some cheeses are much larger than any of these. It may take but a few days and it may take many months to ripen a cheese. It depends upon

the flavor wanted. The man said that in England *strong* cheese is generally liked, while in our country *mild* cheese is preferred. A longer time is required to ripen a strong than a mild cheese.

The cheese factory of which this is the storeroom is in Holland, and is more than three hundred years old. Have you ever seen cheeses shaped like these?

I asked how much cheese five thousand pounds of milk would make, and was told that it would make between four and five hundred pounds.

On the way home Uncle Ben told us that, although

our country is a great dairy country, we import certain kinds of cheese from Europe. He told us how the Swiss people pasture their cattle on the steep mountain sides, and that in every little mountain valley cheese is made, some of which finds its way over the mountains and across the sea to the United States.

Why is the milk weighed when it is taken to the cheese factory?
What two things are done to cause the milk to curdle quickly?
Of what use is the whey?
Why are cheeses of different sizes?
Read aloud the sentence that shows that we do not make all of the cheese that we use in our country.

THE FISHING INDUSTRY

Have you ever stood by the side of a stream and watched the fish dart from one shadow of overhanging rock into another, or swim lazily at the bottom of some deep pool? How gracefully they move and turn! How like water jewels they flash as the sunlight falls upon them!

Most streams and lakes, like the ocean, contain fish. So we have fresh-water and salt-water fish. There are a few bodies of water so full of salt that fish cannot live in them. Do you know of any such bodies of water?

Most of the fish used as food come from the ocean. In this, and in most other countries, there are many men who do nothing but fish, in order that other people may be supplied with this sort of food. They do not depend upon hook and line alone, but use nets also.

Nets are great sacks made of cord, knotted or woven together in such a way as to leave spaces or *meshes*. These meshes are not big enough to allow large fish to escape. Sometimes the fishermen go out in rowboats some distance from shore and then throw the net into the water. Corks or floats keep the upper edge of the net near the surface, while weights hold the lower edge on the bottom. Ropes are fastened to each end, and so it is drawn toward the shore. How the fishermen wish that they could see to the bottom of the restless

water and know what their harvest is to be! When the boats have almost reached the shore, horses are sometimes driven into the water and hitched to the ropes. At last the net is dragged out upon the sands and the uncertainty is past.

Look! Within the folds of the net is a countless

A Fishing Schooner of a Common Sort

Besides sailing vessels, steam trawls are in common use.

number of fishes, each jumping, squirming, wriggling, trying to get back to its ocean home. They are of many sizes, shapes, and colors. Those not good for food, together with the smallest ones, are thrown back into the water.

Sometimes a net called a *dip-net* is dropped from a fishing schooner and drawn about a *school* of fish. I have seen many barrels of fish brought up at one time in this way.

The fishermen keep a close watch for the appearance of these schools, you may be sure. Whales and dolphins pursue them, and gulls and cormorants circle overhead, for they, too, are fishers. Their appearance helps the men to tell where the schools are. There is a great rush for the fishing grounds when they are sighted. The white-sailed schooners skim over the waters almost like a flock of birds.

In addition to the sailboats there are many power boats used in the fishing industry. These do not depend upon the wind and are, therefore, of great advantage to the fishermen.

Large quantities of fish are caught by a method called *trawl fishing*. This may be carried on miles from the shore. How do you suppose it is done? To a very long and strong line, many shorter ones, each with a hook at one end, are attached. These lines, to which large buoys are fastened, are left in the water for several hours, and then fishermen in flat-bottomed boats called *dories* row out from the schooner and examine them. The lines are then reset and the fish taken to the schooner to be dressed. This is a common method of catching codfish, which is carried on during summer and winter alike. Storms and fogs are likely to occur while the men are out in their little boats, making their work full of danger as well as of hardship.

Many of the fish are packed in ice and sold fresh, while others are cured on the boats or on shore. Some

of the fishing schooners carry great quantities of salt when they start out on a trip. The fish are dressed and packed in this. Sometimes they are packed in brine, and along the shores of some countries they are strung on poles to dry.

Codfish are dried in great quantities along the New

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Fish from Alaska in Cold Storage at Seattle, Washington

England coast by placing them on frames made of strips of wood and raised a little above the wharf so that the air can circulate freely. When the skin and bones are removed and the flesh cut into tiny strips, it is called *shredded* codfish.

The principal food-fish are the cod, mackerel, her-

ring, halibut, shad, salmon, and whitefish. Whitefish are caught in the Great Lakes. To this list the lobster may be added, although it is not a fish.

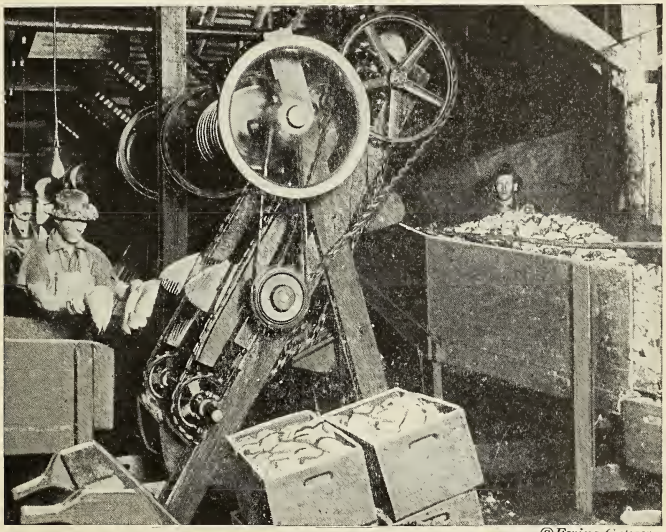
A common method of catching lobsters is to sink a box made of lath to the bottom, where they crawl about on the rocks. A fish head is placed in the box for bait. The lobsters crawl in and are likely to remain until the box is examined.

Lobster steamers, fitted up with tanks containing salt water, run from Nova Scotia and Newfoundland to Boston and New York. The lobsters that are not needed here are placed on cars containing similar tanks and sent to interior cities. In this way fresh lobsters are served thousands of miles from where they were caught.

A lobster that would cost us seventy-five cents brings the fisherman not more than twenty cents.

Along our New England coast there are many towns engaged extensively in fishing. Portland, Gloucester, Boston, and Provincetown are among the number. Boston is the most important fishing center in the United States. From it fishing schooners go as far as Newfoundland, Greenland, Iceland, and even to the coast of Ireland. There are also important fisheries on the Pacific coast, from San Francisco to Alaska. Here the salmon are taken in great numbers. They weigh from twenty to one hundred pounds. The fish are canned and shipped to all parts of the country. Besides being caught in nets and traps and on lines many are caught in *fish wheels*. These are fastened to the sterns of boats and revolve in the water. The fish are caught in pockets and dropped into the boat as the wheel brings them up over it.

There are very extensive fisheries along the shores of the British Isles and on the western coast of Europe. Fishing is the chief industry in the towns along the coast of Norway. The air is full of the odor of fish, while drying fish, nets, and boats are everywhere in sight.



Cutting Fish by Machinery at a Large Alaska Cannery

The sea contains a very large amount of food. The harvests of the sea can be gathered more cheaply than can those of the land.

Many countries have *hatcheries* in which the eggs of both fresh and salt water fish are hatched. The

young fish are used in stocking lakes, streams, and the ocean. Laws have been passed for the protection of certain kinds of fish.

Our lakes and streams can be made to yield much more food than they now yield. Raising fish and increasing our use of this food is conserving meat. This is because fish contains considerable *protein*, a valuable substance found in meat.

The great ocean is free to all to sail over or fish in at will. There is a narrow strip along the shore three miles wide, which belongs to the country which it borders. The men of other countries are not allowed to fish there.

The fisherman is a brave and sturdy man. His life is full of danger. He battles constantly with the winds and the waves. Fogs may hide the sharp rocks which seem to wait for a chance to destroy his little vessel. Sometimes icebergs or great ocean steamers sink his boat and he is never seen again.

When storms are raging and night has settled over sea and land, and angry waves are dashing themselves into foam against the shore, the mothers, wives, and children look anxiously from their cottage windows toward the sea, and pray that their loved ones may return to them in safety.

Why is it that fish do not live in some bodies of water?

Read aloud the sentence that tells where most of our food fish come from.

After the net has been thrown into the water, how can the fishermen tell where it is?

Describe trawl fishing.

Tell why ocean fishing is dangerous work.

On the wall map locate our chief fishing centers.

OYSTER FARMING

It sounds strange to speak of farming in the ocean, but there are many and large oyster farms all along our coast. Some of these farms are covered by water all of the time and some are uncovered when the tide is low. Oyster farms are far more profitable than are those upon which corn and wheat are grown.

Oyster farming is a new industry in our country because civilized people have not lived here very long, but it is a very old one in some parts of the world. As long ago as the seventh century a Roman knight raised oysters for the market, and it is said that the business made him very wealthy.

You will understand better about the cultivation of oysters, if I tell you first how they live and grow in their natural homes.

Except during the first few days of their lives, oysters are prisoners. They cannot move about freely from place to place as fishes and most animals can, but they are attached to rocks, to the shells of their dead relatives, and to other objects. How, then, do you suppose they get their food? They grow in immense numbers, and they crowd one another more than people do in the tenement houses in our great cities. In fact, most of them are soon crowded out, and they die, leaving room for the rest to grow upon their empty homes. In this way the oyster beds spread out.

These oyster beds are not found in very deep water, but rather along the shore, generally near the mouth of some river. As I have told you, they often live where they are uncovered when the tide goes out. You can see from this that it is not very difficult to gather oysters, so that, partly on this account, man has used them for food for ages.

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These young oysters have attached themselves to a willow twig that hung down into the water on the bank of the Delaware River.

When the Pilgrim Fathers landed on the shores of New England, they found that the Indians used oysters very commonly. All along the coast were great heaps of the shells. At the very first Thanksgiving dinner given in America, oysters were served.

Oysters used to be so plentiful on these natural beds that they were very cheap. In some places where the winter weather was cold enough to freeze the water along the shore, people cut holes in the ice and gathered the oysters by means of long-handled rakes.

In a single year an oyster will produce more than a million young ones. Just think of it! If all of this

family grew up they would fill a room fourteen feet in each dimension.

These young oysters are *very* small. They are called *spat.* Most of them are drifted away by waves and currents, or devoured by larger sea animals. The few that escape soon attach themselves to some object, so getting a chance to begin the battle of life.

If oysters are caught at all times of the year it does not give them a chance to produce their young, and this, as well as catching the young ones themselves, has destroyed many of the natural beds. In order to keep up the supply of this food men commenced oyster farming. You see how our daily needs and desires lead to the establishment of great industries.

The oyster farmer prepares his farm in various ways. He places clean oyster shells, stones, trays, bundles of sticks, and other things on the bottom, so that the oysters may find something to which to attach themselves. Then he places the young oysters or spat on these objects. When trays are used, several are placed one upon another and bound together by means of a chain. These trays are taken up from time to time in order to gather the oysters that are ready for market.

Stones are sometimes piled on the bottom and the spat are placed in the crevices between them. Often stakes are planted in a somewhat circular form. Cords are attached to the stakes, to which bundles of sticks are fastened in such a way as to keep them a little above the bottom. Young oysters attach themselves to these sticks, which may be drawn up when the proper time comes.

Shells are used more commonly than other things.

They are taken from the restaurants and hotels to the farms in boatloads, to be scattered over the bottom.

The young oysters grow at very different rates. In two years they may grow to be six inches in length, or it may take several years to reach that size. They grow more rapidly on the artificial beds, and are better in quality also. The starfish is one of the greatest enemies of the oyster, large numbers of which it destroys every year.

An Oyster Fleet on the Delaware River

During the fishing season the oyster men go to the beds in their boats and scoop the oysters up from the bottom. This is called *dredging*. The scoops with their loads of oysters are drawn to the deck of the boat by machinery. Sometimes the oysters are gathered by means of long tongs.

As the oysters are usually in clusters, these have to be broken up. For this purpose a sort of a hammer known as a *culling iron* is used. The oysters are broken

Oyster Dock and Shed on the Delaware River

What is being done with the oysters here?

apart and sorted. Sometimes the oyster man makes three grades and sometimes four.

Oysters are not the only things drawn up in the dredge. Starfish, lobsters, and various kinds of fishes are gathered in. The starfish are killed and the rest thrown back.

The oysters are heaped up in great piles on the deck of the boat. Sacks and barrels are filled with them, and many carloads are shipped daily from the cities near the fishing grounds. Chesapeake Bay is the center of the oyster industry in our country. Locate it. There are, however, many oyster beds elsewhere on the Atlantic coast and some on the Pacific coast.

Great quantities of oysters are canned near where they are caught. Getting them out of their shells is not an easy matter. For this purpose a knife is used. This work is called in the South *shucking oysters*. Canning oysters is an important industry in the city of Baltimore. Have you ever seen cans of oysters that came from there?

Where are the oyster farms located?
In what very interesting way do oysters live?
Why is it easier to obtain oysters than fish?
Why did men go into the business of oyster farming?
What is the greatest enemy of the oyster?
Describe the work of dredging.
Why are oysters canned?

A RICE FIELD

When you do not feel quite satisfied with your breakfast, dinner, or supper, and think that there should be a greater variety of food on the table, just come with me and we will visit some of the boys and girls of faraway China. What do you suppose *their* chief article of food is? Rice. Rice in the morning, rice at noon, and rice at night. Rice from the beginning to the end of the year. In the poorer families a bit of dried fish and some vegetables are usually eaten with it. Those who can afford such things have bits of preserved ginger, mushrooms, and barley cakes with the rice. Of course the rich people have other things to eat, but most of the people of China are poor.

In the fertile portions of China the people live very close together. Gardens take the place of farms. Workmen often receive no more than twenty-five cents a day. On this account they cannot afford the variety of food that we have, but must be content with whatever is cheap and nourishing for their labor. If the rice crop were to fail, the Chinese would suffer. You will see how important this food is to them when I tell you that rice means more to the Chinese than wheat means to us.

Perhaps you are wondering where the rice that we use in this country comes from. Rice is grown in great quantities in Japan, Korea, Indo-China, Ceylon, India,

the Philippines, the Hawaiian Islands, our Gulf states, and California.

Rice is the chief food of one-third of the people of the world. Although we grow large quantities, we do not produce enough to meet our demands. It is a kind of grain which will not thrive on the fertile Western prairies where corn, oats, and wheat grow. It needs a warm climate and a great deal of water. For this reason the rice fields are found on the marshy lands near the coast, and by the banks of rivers, where they can be easily flooded. Some rice is grown on the uplands, but not so successfully as on the lowlands.

Pumping Water to Irrigate a Rice Field in Japan

Canals are dug from the streams through the farms, and from these smaller ditches branch off so as to reach all parts. They are so arranged that the farmer can turn the water on or off

Harvesting Rice in California

Of what other crop are you here reminded? — Large quantities of rice are grown in California, as well as in Louisiana and Texas.

whenever he wishes. On some of the farms wells furnish the water to the canals.

In the Gulf states the fields are plowed in the winter, and the rice is sown between the first of April and the middle of May. Sometimes the seed is sown broadcast, as wheat once was, and sometimes it is planted by rice seeders in drills a few inches apart.

The Japanese sow the seed in gardens, and when the plants are eight or ten inches high they are pulled up and transplanted to the fields. The men work right in the water, for the fields are flooded at the time.

In our country the farmer floods the field as soon as the seeds are planted, allowing the water to remain five or six days. When the young blade of rice is a few inches high, the field is again flooded. After the second leaf appears on the stalk, the water is turned on and left for twenty or thirty days. After the land dries the crop is hoed. The fields are irrigated from time to time, until about eight days before the harvest, which generally occurs in August.

When full grown, the stalks are from one to six feet in height, with long, slender leaves. The kernels grow much as do those of wheat and oats.

On account of the fields being so wet, rice, in most countries, is cut by hand. In China and Japan small curved sickles are used, and the grain is bound up in very small bundles. In Lousiana and some other parts of the South, regular harvesters are used. They have very broad wheels. Why?

After the grain has been bound into bundles, these are set up in double rows to dry. This is called *shocking*

the rice. The grain is then put through a threshing machine, to separate it from the straw.

Rice kernels are covered by a husk. Before the husk is removed the grain is often called *paddy rice*. Removing the hulls or husks is called *hulling*. The hulling machine is a long tube into one end of which the

Threshing Rice by Hand in Japan

rice is poured. Within the tube are ribs which revolve rapidly. As the kernels pass between these the hulls are taken off.

If you were passing through a Chinese village, you might hear sounds like those produced when a man pounds with a mallet on a great piece of timber. On

searching for the sounds, you would find that they came from a rice mill. The mill consists of a portion of a log hollowed out and placed upright. In the hollow a quantity of rice is held. A piece of timber, fastened to a pivot, extends in a horizontal position with one end over the mill. To this end another timber is fastened in an upright position. The miller gets on the end of the long timber which is farthest from the mill. This raises the end with the upright. He then jumps off and the upright falls, striking upon the rice. In this way the hulls are worn off. This interesting method is not used in the larger towns and cities. There the hulling is done by machinery.

After hulling, the grain is carefully screened, in order to remove the hulls, the broken and very small kernels, and the *rice flour*. This last makes good cattle food.

Perhaps you have noticed that rice kernels have a bluish appearance. This is not natural, but is the result of polishing. The polishing removes much of the best part of the grain, but the rice sells for a higher price simply on account of its appearance.

The polishing machine is cylindrical or drumlike in shape. Moosehide or sheepskin is tacked to the cylinder. It is made to revolve rapidly, so that the kernels are polished as they pass over the skin. After being polished the kernels are run through screens and sorted. The rice is then put up in barrels or sacks and shipped.

Using polished rice is, as you see, a waste of food. This is only a part of the waste, however. The machinery costs money and men must be paid to do the polishing. The use of polished rice is therefore a waste of money, time, and food. Let us save by using the

unpolished rice or the brown head rice which is even better.

On a globe locate the chief rice growing countries.
Why is so much rice eaten in China?
How do the farms in China differ from those in our country?
Why can we not grow rice in all parts of the United States?
In what ways is the harvesting of rice in our country like the harvesting of wheat?

HOW SUGAR IS MADE

This picture represents one of the beginnings of the great industry of sugar making. The small objects which you see in the trenches are pieces of sugar cane. These *cuttings*, as they are called, are covered with soil. They soon sprout, and from them grow the tall, waving fields of cane, which resemble cornfields. The canes are taller than cornstalks, however. How high do you think those shown in the picture are?

In about ten months after planting the cane is ready to cut. In the Southern states this work usually begins about the middle of October.

The canes are jointed, as cornstalks are, and the spongy substance between the joints is filled with a sweet juice. It is from this juice or sap that cane sugar is made. I have seen children chew pieces of the cane, and enjoy it as you do candy. This is because there is so much sugar in the cane.

After the canes are cut they are hauled to the mill or sugarhouse on wagons. On the large plantations *tram cars* sometimes run right into the fields.

At the mill the canes are run between heavy rollers, which squeeze out the sap. Sometimes as many as seventy-five pounds of sap are obtained from one hundred pounds of cane. The crushed stalks are used in the mill for fuel, and the ashes are returned to the land to fertilize it.

When the juice is first pressed out, it is not at all clear in color. It is therefore filtered and then boiled in vacuum pans. The boiling evaporates the water which is in the sap, and causes the sirup to crystallize. The mass, consisting of molasses and brown sugar, is next

Planting Sugar Cane

placed in a rapidly revolving machine. The molasses escapes through a fine wire screen and the brown sugar is left.

The sugar must next be refined. For this purpose it is usually sent to cities outside of the sugar belt. There

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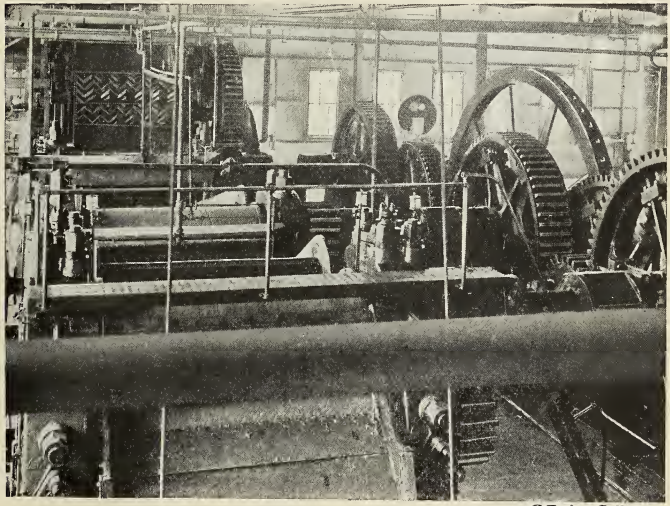
Sugar Cane in Bloom in Java

How does this compare with corn in height?

are great refineries in New Orleans, San Francisco, St. Louis, Chicago, and other cities.

When the *raw sugar*, as it is called, reaches the refinery, which is generally a tall building, it is taken to the top story and dissolved in hot water. It then passes through bags which act as *filters*, and through a great



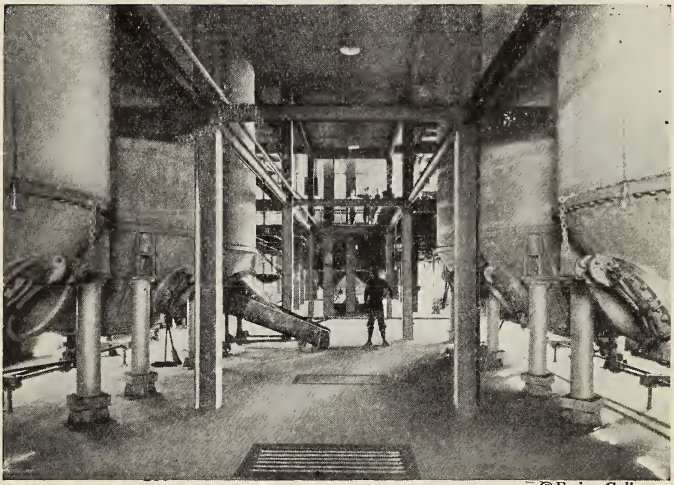
A Sugar-Cane Crusher in Louisiana

Point out the sugar cane in the picture.

cylinder which contains burned bones, known as *bone-black*. You remember that I told you that the bones of the cattle were saved. This is one of the uses to which they are put. When the liquid comes out of

this bone filter it is a perfectly clear sirup, which is then crystallized.

You know that we buy refined sugar in three forms: granulated sugar, loaf sugar, and pulverized sugar. When granulated sugar is wanted, the crystals are placed in a great drum, which revolves until they are



Refining Sugar with Boneblack in Louisiana

The man is removing boneblack from one of the big tanks, where it has been bleaching or whitening the sugar.

thoroughly dried in the right form. To make loaf sugar, the crystals are pressed into molds, then dried, and cut into the size desired. In powdered sugar they are simply ground to a powdered condition.

Think how much labor is required to produce sugar, and yet you can buy it for a few cents a pound.

There are great fields of sugar cane in the Gulf states, in Cuba, in the Hawaiian Islands, in the East Indies, in India, and in other warm, moist parts of the world. We buy a great deal of sugar from Cuba and from the Hawaiian Islands. To what city do you think the sugar from the Hawaiian Islands is sent?

How is sugar cane planted?

Describe the appearance of a field of cane when the crop is ready to cut.

Read aloud the sentence that tells why sugar cane is not grown in the central and northern parts of our country.

How is the cane cut?

How is the sap obtained from the stalks?

Tell how the sap is changed into sugar.

On the wall map locate the chief cane sugar-producing countries.

BEET SUGAR

Although the cane fields of the moist, hot countries yield great quantities of sugar, there are other sources from which this useful product comes. In the year 1747 a German scientist discovered that sugar can be made from beets, and now about a half of our supply comes from these plants.

The sugar beet is not just like the plant of the same name which we raise for table use. It is white, and sometimes weighs as much as ten or fifteen pounds. Beets do not need so much water or so much heat as sugar cane; so they can be raised in Germany, France, Austria, Russia, and other countries, as well as in California, Utah, Idaho, Colorado, Nebraska, Wisconsin, and other states in our country.

In many parts of the West there are fields of beets stretching for miles. The seeds are planted in rows, which, after the plants have come up, are thinned. In four or five months from the time the seeds are planted, the beets are ready to harvest.

On most of the large *ranches* the beets are dug by machinery. Men then move back and forth in the fields, cutting off the leaves and a little of the upper part of the beet, for this contains too much mineral matter to be of value in making sugar. The workmen use large knives, and they work on their knees.

The beets are now taken to the factory in trucks, or, if it is far away, they are sent on trains. When the loads of beets reach the factory, they are weighed. The drivers then drive up an inclined plane to a plank roadway. There are generally several of these. On each side of the road or platform are deep V-shaped trenches

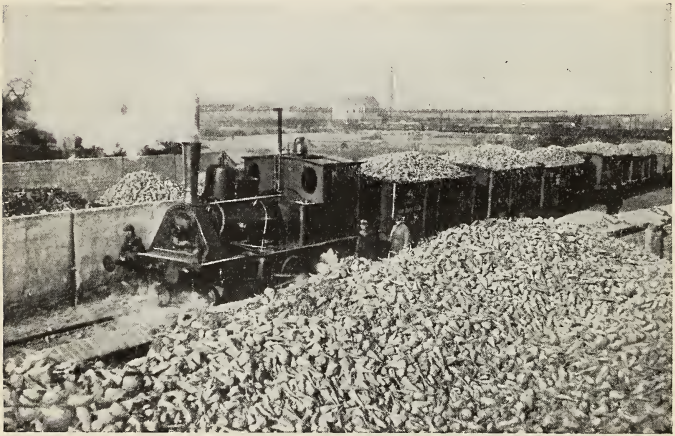
Harvesting Sugar Beets by Machinery

with wooden or cement sides in which streams of water run. When the truck has reached the right spot, the platform upon which it rests is raised in a slanting position, and the beets fall into the trench.

A basketful of beets is taken from each load and tested to see how much sugar they contain, for this determines the price to be paid.

The stream of water in the trench carries the beets along, just as they would be carried in a brook. This, you see, is a quick and easy way of washing them.

The streams of water carry the beets into the factory, where they are cut up into strips by machinery. The juice is then washed out in vats containing warm water, and is boiled down in great tanks. The raw



A Trainload of Sugar Beets

sugar is refined much as the cane sugar is. After the sugar has been dried, it is run through spouts into sacks held open to catch it as it comes out. One hundred pounds are put into each sack. One workman sews the sacks up and another wheels them to the warehouse. Trainloads are carried away to be distributed in the parts of our country that do not produce sugar.

Why can sugar beets be grown where sugar cane cannot be grown?

If sugar cane and the seed of the sugar beet were planted at the same time, which crop would be ready to harvest first?

How are sugar beets harvested?

Why are the beets tested when they are taken to the factory?

How is the juice obtained from the beets?

MAPLE SUGAR

You would enjoy helping to make some maple sugar, I am sure; so let us take a trip to the woods of Vermont or New York, where maple sugar is made from the sap of the sugar-maple tree.

You will need your cap and mittens, as the sugar season is the early spring, when there is yet snow on the ground. Besides, some of the work is done at night, and you will not wish to miss that.

The owner of the *sugar bush* bores holes into the trees a short distance from the ground, into which he slips small spouts called *spiles*.

This is called *tapping* the trees. Underneath the spout a pail is placed. During the day the sap trickles out and runs into the pail. During the colder hours of the night the sap flows slowly, if at all. Sometimes it is so cold that little sap runs for two or three days at a time.

The sap is collected in barrels and drawn on sleds to the camp or place where it is to be boiled down. This is done in great pans called *evaporators*, which may be five or six feet wide and fifteen feet long. They are divided into sections, and these are connected by means of little openings.

The sap flows into one end of the evaporator and follows a zigzag path through the different sections. Since it flows slowly over so large a surface, evapo-

ration goes on rapidly and the sap is changed to sirup by the time it has finished its journey.

The sirup is put up in cans or boiled down into sugar, which is molded into small cakes and brings a high price.

Sugaring off, as the boiling down of the sap is called, is quite an event. Often a number of people will be invited to go to the sugarhouse and take part in the operation.

Before the modern evaporator came into use sugaring off always occurred at night. This was necessary because during the day the sap buckets had to be attended to. The young people would sing songs, tell stories, and eat sugar.

Tapping a Maple Tree for Sugar

Some of the sugar bushes contain but a few trees and some contain one or two thousand or even more. A tree will yield from one to six pounds of sugar during a season.

Our country produces great quantities of sugar every year, but we use so much that we have to buy much more than we manufacture at home. It was not always

in such common use, however, because people in olden times did not understand how to make it cheaply.

Long, long ago sugar was used only as a medicine. Don't you wish that all medicine to-day was as good as sugar? About seven hundred years ago an Italian nobleman died and left to his relatives, among other things, *six pounds of sugar*. His will caused considerable comment among the people, who said that no one family should be allowed to have so much sugar in its possession.

During the World War we were obliged to use much less sugar than we had used before. We wanted our soldiers and our Allies to have all that they needed of this important food. We all saved gladly and we did not suffer as a result.

Now that the war is over, we must not think that we do not need to save. The cost of living is high, and we spend much money for sugar. We should have all that we need of this food, but none should be wasted.

We are all fond of candy and ice cream. This is largely because they contain so much sugar. Pure candy and ice cream are good foods when eaten in moderate amounts. But we nearly always eat them when we do not need food at all. This means that both the sugar and the money are wasted.

Cakes, pies, and cookies are enjoyed by most people. In making these foods much sugar is used. These desserts are usually eaten after we have had a hearty meal. Partly because of this we often fail to eat what is set before us. In our homes we can avoid this waste by asking for smaller portions.

Have you ever seen sugar in the bottoms of tea and

coffee cups? If you have, you have seen sugar that was wasted. It is better to put in a smaller amount and stir the drink thoroughly. Then no more will be added than is wanted.

You know that soda and other *soft drinks* are sold in every village and city. In making these drinks, large quantities of sugar are used. The fewer of these drinks we buy the more sugar and the more money we shall save.

You have learned that sugar is obtained from three plants. There are many food plants that contain considerable sugar. Among them are corn, potatoes, beets, and fruits. Milk also contains sugar. You see that our foods are sweetened by nature as well as by ourselves. By selecting certain foods we can increase our supply of sugar.

In the flowers in the fields, the clover in the meadows, and the blossoms on the orchard trees, there is a very large supply of sweets. The honeybees change a small part of this into sugar. Most of it is lost because there are not enough bees to do the work. Of course the use of honey saves sugar. Boys can learn how to handle bees and so save money for the family and earn money for themselves.

You see that there are many ways in which the soldiers of the Conservation Army can save sugar. If each person in the United States will save one-half ounce of sugar each month, the total monthly saving will amount to many carloads. Saving sugar occasionally will not help very much. We need to form the *habit* of saving. Your help is needed. Will you begin to-day to save?

On a map locate Vermont and New York.
Describe the tapping of maple trees.
When does the sap flow best?
Tell how the sap is collected.
How is the sap changed into sugar?
Tell why you would like to visit a sugar bush.
Explain how the soldiers of the Conservation Army can serve their country by saving sugar.

WHERE SALT COMES FROM

The Arab, journeying over the yellow sands, riding upon the back of his faithful "ship of the desert," often looks longingly for some sign of water to cool his parched lips. The sailor may ride upon the beautiful blue waters of the ocean in his white-winged ship; but although there is nothing but water to greet his eyes, he cannot drink it, for it is bitter to the taste.

If you were to place a quantity of ocean water over a fire and evaporate it, there would remain a white substance. This is common *salt*. You see that it is as necessary to provide fresh water when one wishes to cross the ocean as it is if one is going to cross the desert.

Most streams and lakes contain *fresh* water, so you will wonder why the waters of the ocean are briny. The rocks and soil of the earth contain salt, and the streams wash it from the land. Each one carries so little that we do not notice it, but they have worked so steadily and so long that they have carried a great amount to the sea. None of it can escape, so the ocean gets more and more briny.

No healthy person would ever think of eating salt alone as a food, and yet our food would taste very unsatisfactory without it. Farmers supply their cattle and horses with salt, and wild animals search for it in the forests and lick it from the soil with their tongues.

Salt is so important to us that I want to tell you about some of the ways in which men obtain it.

Sometimes sea water is placed in great vats and evaporated. This leaves the salt, which is then refined. You know that the sun's heat causes the waters of a shallow pond to evaporate during warm weather. Shallow basins are often scooped out along the coast, and

A Large "Pool" of Salt After Evaporation Has Been Completed

This salt is being "harvested" near Great Salt Lake.

the waters which fill them are then shut off from the larger body. In time the water evaporates, and the salt, which has formed in thin layers, is collected.

I said that most lakes are fresh-water bodies. There are some, however, that are very salty. Great Salt

Lake is one of these. Streams flow into it, but none flows out. If you were to bathe in the waters of this lake, you would find that your body would not sink, because the water is so heavy with the salt.

I have seen great piles of glistening salt along the shore of Great Salt Lake which had been obtained by

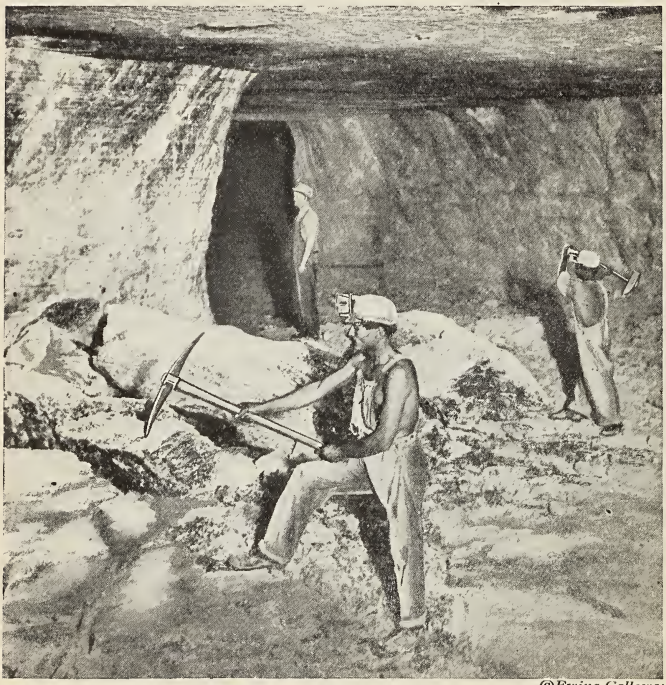
Loading Raw Salt into Box Cars near Great Salt Lake

evaporation. A railroad runs beside the lake, and the salt is loaded upon the cars to be hauled away. When the people first settled in Utah, they used to drive to the lake in wagons to get a supply of salt.

Although the ocean and a few lakes contain immense

quantities of this useful article, we get most of our supply from other sources.

In the western part of New York State at some dis-



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Mining Salt in Kansas

tance below the surface of the earth, there is a thick layer of salt. Wells are drilled down to this; water is pumped into them, and then pumped out again as

brine. This brine is evaporated in large pans made of iron, two quarts of brine yielding about a pound of salt.

In China salt has been obtained in this way for hundreds and even thousands of years. Though men had little machinery to work with in those days, yet by patient, steady effort, they drilled wells two thousand and even three thousand feet in depth. From twenty-five to forty years were required to drill some of these wells. Those who commenced them knew that they were not likely to enjoy the fruits of their labor and that others must get the benefit of what they did. What does this show about these people? What benefits are you receiving from what others have done?

Salt is also mined as coal and iron are. This is called *rock salt.* It is obtained in Germany, Poland, Austria, India, the United States, and in many other countries.

In order to purify the brine the makers of salt boil it in iron pans and treat it in various ways to make it fit for table use. When evaporation is rapid, the salt crystals are quite small, but slower evaporation produces larger ones. Rock salt is dissolved in water and then evaporated. To get the finest of salt, one must grind the crystals. When salt is to be used for other purposes than to season food, not so much pains are taken. Name other uses of salt.

In olden times, when salt was not so easily obtained as it is to-day, it was regarded in some countries as a luxury. This seems strange, does it not? At one time the Chinese made it into little cakes, stamped the image of the emperor upon it, and used it as money. In Arabia those who shared food which had been salted, believed that this established a special bond of friend-

ship between them. This led to the old saying, "There is salt between us."

How does the ocean get its salt?
How do wild animals secure salt?
How is salt obtained from the ocean?
Locate Great Salt Lake. Tell why you would like to visit it.
Describe how salt is obtained from wells.
Describe a third method of obtaining salt.
Why is salt important?

MACARONI AND VERMICELLI

Have you ever wondered as you have looked at the hollow sticks of macaroni in the stores or as you have eaten them at the table, how they were made in that way, and what they were made of?

In Italy macaroni is a very important article of food, and its use is rapidly increasing in our own country. For a long time it was not made outside of Italy, where the city of Genoa was the center of the industry. Locate this city. Do you know what great man was born there? Now macaroni and vermicelli are made in other countries. There are a few factories in the United States, but most of what we use still comes from Italy.

In making these foods only the best hard wheat is used.

After the wheat has been ground, the bran is taken out and the flour is placed in a large wooden tub. Water is added, and the two are mixed by hand for a few minutes. In this tub a marble wheel about five feet in diameter and eighteen inches in thickness is fastened in an upright position. This wheel weighs about a ton.

After the flour and water have been mixed, the wheel is set in motion by machinery, and it slowly circles around in the tub, pressing the dough under it.

A man keeps walking in front of the wheel, moving the dough from the edges of the tub and placing it

directly in its path. This work of pressing the flour into a paste continues for a little more than half an hour.

The wheel is then stopped and the paste, which is quite stiff, is cut into cakes about a foot square and from one to three inches in thickness.

These are put into an iron cylinder heated by steam. In the bottom of the cylinder is a copper plate filled with holes having the centers filled. A cover fitted to a great screw which turns by machinery is placed on top. This slowly, but steadily, presses the paste downward. It is thus forced through these openings, and of course comes out in the form of round, hollow pipes.

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Drying Macaroni in a New York Factory

As these pipes issue from the cylinder, they are straightened out on a wooden tray or platform, and with a large, sharp knife cut into lengths of about three feet. They are then taken to a drying room and spread on wire frames covered with oiled paper. Here they

Drying Spaghetti in the Street in Sicily

What objections can you suggest to drying spaghetti in this way?

are left for about five days, after which they are placed in boxes and are ready to ship.

The only difference between macaroni and vermicelli is that the sticks of vermicelli are very small and are not hollow.

When vermicelli is wanted, two plates are placed on the bottom of the press. The under one is of iron and contains holes about one inch in diameter. The upper one is of copper and contains *groups* of very small openings. There are sometimes eighty of these openings in a group. When the plates are screwed together, the small holes are directly above the larger openings.

As the paste is pressed, it passes through the little holes and then issues from the larger ones; this keeps each little group somewhat apart from the others.

Saffron is added to the paste to color it, and the great golden mass is a pretty sight as it lengthens.

The workman cuts off six or seven feet of it at a time, and, holding it above his head with one hand, he shakes it out with the other, as one might shake the folds of a piece of silk. The pipes tangle up very little. They are cut into lengths of about eighteen inches.

It is then taken to the drying room and spread out on the trays just as the macaroni is. A handful of the vermicelli is taken at a time, and by a peculiar twist of the arm it is placed on the paper in a form like that of the letter N. It is then dried for shipment.

From what are macaroni and vermicelli made?

Describe how the dough is worked.

Make a sketch on the blackboard showing why the pipes of macaroni are hollow.

How is macaroni dried?

ON A COFFEE PLANTATION

Juan and Lupe live in a beautiful valley where palm and banana trees wave their broad leaves in the breeze. It is never cold there, so that many kinds of plants and flowers grow out of doors which we do not see in our country except in greenhouses. On clear days they can see lofty mountains far to the westward, which sometimes wear caps of white.

Juan is fourteen years old and Lupe is twelve. Their skin is much darker than yours, and they have bright black eyes and black hair. Their father owns a great coffee plantation in Brazil, not far from the city of Santos.

Many men, women, and children are employed on the plantation, and Juan and Lupe enjoy roaming about from place to place and watching them at their work.

In the *nursery*, where the little trees are started, they see men planting the coffee seeds in the rich soil. There are some plants that have just come up, and some that are ready to transplant. They are set out in rows, six or eight feet apart each way, and sometimes more.

The trees would grow much taller than they do if they were not kept pruned. Do you know why they are prevented from growing tall? Whenever you look at a coffee plantation, you see the dark green foliage

of the tree, which is an evergreen. Lupe is very fond of the blossoms. They are clear white and very fragrant.

A tree will yield a small amount of coffee the second year after planting, but it will not produce a full crop for five or more years. Two pounds is a good average crop for a tree.

Coffee Pickers on a Plantation in Brazil

The children like to watch the pickers as they go from tree to tree. Many of them are about their own age. Some carry a sack slung over the shoulders, and others carry baskets or pails. The *berries* must be picked by hand, for they do not all ripen at once. They are dark scarlet in color and look a little like cranberries. A good picker gathers about three bushels in a day. The pickers are given a check every time they fill a

basket. Sometimes Juan attends to this work, and he enjoys it very much. At the end of each week the pickers are paid according to the number of checks they have.

Within the berry are two kernels, or seeds, with their flat sides together. These are called *coffee beans.* It is these beans from which the drink is made.

The picking is but a small part of the work of preparing coffee for the market. The first operation is removing the pulp. This used to be done by tramping on the berries, but now it is done in a better way.

The berries are thrown into a large tank filled with water, which carries them through a pipe to the *pulping* machine. This machine removes the pulp and separates the beans.

Next the beans are carried to a second tank, where they remain for about twenty-four hours, to wash off a sticky substance which covers the shell of the bean.

If you have ever put beans or peas into a basin of water, you have noticed that nearly all of them sink, while a few float. Those that float are the poor ones. This is the way in which the good and bad coffee beans are separated. A pipe carries off the seeds that float on the surface of the water.

The beans are dried on cement floors upon which they are spread. This drying takes a long time. Before sunset each day the coffee must be carried under shelter, for the dew injures it. While the beans are drying, the workmen stir them. Sometimes artificial heat is used, but this is expensive. Juan's father has a watchman whose duty it is to guard the coffee at night, for it is very valuable.

Each bean is covered with a strong shell, or hull, which has to be removed. The soaking loosens this, so it comes off easier than it otherwise would. Juan and Lupe often watch the wheels of the huller as they turn, moved by patient oxen.

Drying Coffee in South America

There are two wheels set upright over a circular box into which the coffee is put. As it passes between the wheels and the bottom of the box, the hulls are removed. Underneath the hull is a thin skin, which is also taken off.

In some countries people want the coffee dyed, or

colored. A bluish color is given to it by coating the wheels of the hulling machine with lead.

The hulls are separated from the beans in a *winnowing* machine, and the coffee is then sorted. Often this is done by hand. The beans are spread out on a table, and girls and boys, and sometimes grown persons, sort it into several grades.

Loading Coffee on a Steamboat in Colombia
Consult your geography to learn what river this is.

Juan's father has this work done by machinery. The coffee is put into a cylinder, in the bottom of which there are holes of different sizes by which it is graded.

The last process is to sack the coffee and send it by railroad to Santos. Of course it is neither roasted nor ground until it reaches its destination.

We do not produce coffee in our country, but we are

the greatest coffee drinkers in the world. A large part of our supply comes from Brazil. Trace the course of the ship from Santos to New York. Juan has often done this, and his father has promised to take him with him sometime, when he goes with a cargo of coffee.

You naturally think that coffee of different names must come from different countries, or at least from different trees. This is not always the case. Several brands may come from the same tree. The name depends partly upon the size and the general appearance of the beans.

Coffee is a native of the Far East, but it has gradually been transplanted to other regions, until it is now grown very extensively. Brazil, Central America, Mexico, the West Indies, the Hawaiian Islands, Java, Ceylon, and Arabia are coffee-growing countries.

In 1551 coffee found its way to the city of Constantinople; in 1652 it had reached London; and in 1720 it was planted in the West Indies. You see it worked its way westward rather slowly.

Several hundred years ago, coffee was very expensive. It was served at *coffeehouses*, where men brought whatever news they had heard and told it to one another. In this way these places served about the same purpose that newspapers do now.

Locate Brazil on the map.
Locate the city near which Juan and Lupe live.
Why is picking coffee rather easy work?
Why are the berries picked by hand?
How is the pulp removed?
What work can children do on a coffee plantation?
Locate the chief coffee-producing countries.

THE TEA GARDENS OF CHINA

At the bottom of the teapot you will find some leaves. Spread one of them out carefully. You can see that it was once long and slender, a little like willow leaves. It may have grown in some garden in far-away China, for we get a great deal of tea from that country.

I have told you how close together the people live on the fertile plains of eastern China. There is so little room that many live on boats on the rivers and in the harbors. On this account their farms are not so large as ours.

The tea trees in the gardens are about five or six feet high. If they were allowed to, they would reach a height of twenty-five feet; but they are kept trimmed for the same reasons the coffee trees are pruned.

The trees are raised from seeds, and are generally planted on land which slopes toward the south. What advantage is this?

In about three years after planting, the first crop of leaves can be gathered. In China they are usually gathered four times each year, and the trees continue to yield for twenty-five or thirty years.

When the leaves are picked, they are full of sap or juice, and so have to be dried. The drying is usually done on trays made of bamboo. While they are drying, they are rubbed and rolled between the palms of

the hands, so that they may dry more quickly and evenly.

Then the leaves are placed, a few at a time, in iron pans over a charcoal fire. They are left in these but a short time, for the pans are very hot. This process is called *firing*. Sometimes the leaves are fired but once, and sometimes twice.

Sorting Tea in Japan

The tea is then spread out, and broken bits of stems are removed. Some of the tea growers place the tea in baskets which are suspended over slow fires, for drying.

If you were to look into some of the *tea-hongs*, or houses where tea is cured and packed, you would find the tea dried in a very curious fashion. In one of the rooms you would see several Chinamen rolling and tossing balls about with their bare feet. The balls are

Picking Tea in Ceylon

about the size of footballs and are partly filled with tea. Although it looks like play, it is hard work. As the balls are tossed about, the tea leaves are given their rounded or twisted appearance. From time to time the workers stop and tie the bags up more closely at the neck. This method is used in making *gunpowder tea*.

Black and green teas are not different varieties, but are produced by different methods of handling.

In the great tea-hongs there are professional *tasters* — that is, men who do nothing but sip tea from small cups, so as to grade it and fix its value. This is considered a very particular line of work and requires an educated taste.

The ocean atmosphere has a bad effect on tea, so that the very finest grades are seldom sent across the sea. When tea is to be shipped by water, it is placed in boxes lined with a sort of sheet lead. This protects the tea greatly. Most of the tea sent to the United States lands at San Francisco. Why? How does it get to other parts of our country?

Great quantities of tea are pressed into the form of bricks and sent over mountains and across deserts into Russia.

This is called *brick tea*. The Russians are great tea drinkers, and whenever anyone calls in Russia, tea is served. They call their teapot a *samovar*.

Better tea is obtained from Ceylon and India than from China. In these countries Europeans have charge of most of the tea farms, and they have carefully studied the cultivation and handling of tea.

There is a little tea raised in our own country in the

state of South Carolina. It is very fine in quality and people are willing to pay a high price for it. Some of it has been sold for five dollars a pound.

When tea was first brought into Europe, it was regarded as a great luxury, just as coffee was. People paid as much as fifty dollars a pound for it. It is said that some of the tea raised to-day for the royal family of China is worth a hundred dollars a pound.

Many people in this country do not enjoy a cup of tea unless they have cream and sugar in it. The Chinese do not use either in their tea. In Russia it is quite common to draw the tea through a lump of sugar held between the teeth.

You know that tea parties are very common. The most celebrated tea party ever held was called the "Boston Tea Party." See what you can find out about it.

How are tea farms started?

Make a mark on the blackboard showing about how tall tea trees are.

What part of the plant is used?

How is tea dried?

Why are teas of different colors?

Locate Ceylon and India.

Locate the state in our country where some tea is produced.

What part of this story interests you most? Why?

A CUP OF COCOA

On the eighteenth day of June, in the year 1771, this notice appeared in the *Essex Gazette* of Massachusetts:

AMOS TRASK,

At his House a little below the Bell-Tavern in Danvers,

Makes and sells Chocolate,

which he will warrant to be good, and takes Cocoa to grind. Those who may please to favor him with their Custom may depend upon being well served, and at a very cheap Rate.

This seems to have been the first notice of the manufacture and sale of cocoa and chocolate in our country. What is peculiar about the notice?

In those days the raw product was brought to Massachusetts by the Gloucester fishermen. They obtained it in the West Indies in exchange for fish and other things which they took there.

When the Spanish soldier, Cortez, conquered Mexico in 1519, he found that the people of that country were very fond of a drink which they called *chocolatl*. It was served to their ruler, Montezuma, in a cup of gold. When the Spaniards went home, they of course introduced the drink into their own country. For a long time it was very expensive and was not commonly used outside of Spain, for the Spaniards kept the secret of its preparation.

Cocoa and chocolate are products of the seeds of a tree called the *cacao* tree. It is a tropical tree and grows in both the Old and the New World.

Although the cacao tree grows wild, it is also cultivated in orchards much like fruit orchards which you have seen. The trees are seldom more than twenty feet high, but they are rather inclined to spread out. They require some shade, so other trees are often planted between the rows to shade them. The trees begin to bear when five or six years old, and continue to yield for forty years. There are generally two chief harvests each year, but the fruit is ripening all the time.

Courtesy of Hershey Chocolate Company

Cutting Off Cocoa Pods

Of what fruit do these pods remind you?

The blossoms, which grow in clusters, are small and pink or yellow in color. They grow directly from the branches or the trunk of the tree.

In about four months after the tree has blossomed,

you will find dark yellow or brown pods hanging from it. These look a little like ripe cucumbers, but they are more pointed at one end and are grooved or fluted. These pods are from six inches to a foot or more in length, with a rather thick, tough rind.

How do you think the pods are gathered? They are

Courtesy of Hershey Chocolate Company

Shelling Cocoa Beans

cut off by men carrying long poles, sometimes of bamboo, to the ends of which knives are fastened. Only the ripe pods are cut off. These are collected in a heap under the tree. They are left in these heaps for about twenty-four hours, when they are cut open and the seeds are gathered in baskets.

The seeds are called *beans*. There are five rows of

them, about the size of almonds, within the pink pulp of the fruit. When fresh they are white, but when dried they are brown. If you taste one, you will find it bitter.

You have often seen on packages of chocolate, as well as on the cans of breakfast cocoa, the picture of a young woman carrying some chocolate upon a tray. It is the picture of a beautiful girl who once served chocolate in the old city of Vienna. Her name was Anette Baldauff, and she married a rich count and "lived happily ever after." It is said that a painting of her hangs upon the walls of the great art gallery in Dresden. Locate the cities I have mentioned.

The seeds are carried from the orchard to the sheds, where they are prepared for market. Here they go through a process of fermentation or *sweating*. For this purpose they are placed in a covered box, or they may even be covered with earth. This is called *claying*. Now the seeds must be dried. They are spread out on platforms, raised a little above the ground so that the air can circulate underneath. On sunny days they are not kept under the roofs, for their only purpose is to keep off the dew and the rain. They are fastened to frames which have wheels under them. At night they are rolled over the cocoa.

The cocoa is stirred by workmen using long shovels or rakes, so that it may dry quickly and evenly. Once a day the beans are shoveled into heaps and the workmen tread upon them with their bare feet. This is called *dancing* the cocoa.

After the seeds have dried for about two weeks they are nearly the color of red bricks. They are put up for

shipment in canvas sacks holding one hundred fifty pounds each. The name of the plantation is usually stamped upon the outside. Guayaquil exports more cocoa than any other city. Locate this city. A great deal comes from the island of Trinidad and from the northern part of South America.

When the beans have reached their destination, they must be cleaned, to rid them of dust and dirt collected on the way. They are then placed in a great revolving cylinder and roasted. You remember that when coffee is roasted it brings out a pleasant odor called its *aroma*. The same is true of cocoa. The roasting also helps to loosen a shell which surrounds the seed. The shell is next removed and the beans are then crushed.

The Mexicans used to crush the seeds on a large stone, hollowed out on top. This they called a *matate*.

The crushing is now done by machinery. The broken bits of the cocoa are called *cocoa nibs*. When the cocoa is ground to a powder, it is put into strong bags and pressed. This pressure removes a part of an oily substance known as *cocoa butter*. Remember, then, that cocoa is the meal or flour made from the crushed seeds from which some of the oil has been removed. Chocolate differs from cocoa in that none of this oil is removed in making it.

You have often seen the words *sweet chocolate* on the labels. This is made by adding a quantity of pulverized sugar to the *plain* or *bitter* chocolate. Sometimes vanilla beans are added.

The pasty mass known as *chocolate* must be molded. When the proper amount has been placed in each of

Courtesy of Hershey Chocolate Company

Sorting Cocoa Beans

several metal molds which rest on a table, they are made to rock or shake, which causes the chocolate to assume the right shape. The molds are then taken to the cooling room, where they are placed on frames, one above another, in long rows. Girls and women wrap the cakes of chocolate in the wrappers specially prepared for them, after which they are packed in boxes ready for shipment.

How many years ago did the notice quoted on the first page of this story appear?

On a map trace a journey from the West Indies to Gloucester, Massachusetts.

Read aloud the sentence that tells why the cacao tree does not grow in cool or cold climates.

Describe the gathering of the pods.

How are the seeds or beans obtained?

Describe the manufacture of the cocoa.

What is the difference between chocolate and cocoa?

A CRANBERRY BOG

WAREHAM, MASSACHUSETTS, Dec. 10, 1922.

DEAR FRANK: How surprised you will be to learn that I am now a country boy. We left Boston early last spring, and came out here to go into the business of cranberry growing. It seemed very strange at first to travel along country roads, or through woods and fields, instead of upon the cement walks of our city streets, but we all think the country delightful.

A cranberry farm is a marsh or a bog, so you will see that the vines need a great deal of water. There are both wild and cultivated bogs. Those that are cultivated are provided with a system of ditches, so that they can be flooded from time to time. It is a good deal like irrigation in southern California, I suppose. We flood the bogs to prevent the berries from freezing, as well as to furnish the vines with water. I will tell you more about that by and by.

Father wanted a larger bog than the one he first bought, so, soon after we came, he got another small piece of marshland which joins it on the west, and started vines on it.

You know that willows, rosebushes, grapevines, and many other plants will grow from *cuttings*. It is the same with cranberry vines. The lower end of each cutting is pressed into the soil, and it soon begins to

grow. They are set in rows about fourteen inches apart. One of our neighbors, who was starting a bog at the same time, cut the vines into pieces an inch or two long, and scattered them over the ground. He then harrowed them in. The vines multiply just as strawberry plants do, by putting out *runners*.

They tell us that our new bog will produce a crop in three years. Do you have to wait that long for a crop of oranges?

By the middle of June our bog was in full blossom. The flowers are small and flesh-colored. I read an interesting thing about them the other day. It seems that the berries used to be called *craneberries*, because people thought that the blossoms, just before they opened fully, "resembled the neck, head, and bill of a crane." By dropping the *e*, we got the present name.

During our harvest time, which lasted from the middle of September to the last of October, we were very busy. We did not commence to go to school until the berries were picked. You see, frost may occur and spoil the crop, so everybody works as fast as possible until the harvest is over. Father had about twenty pickers some of the time, besides our own family.

When we were ready to begin picking, father took some twine and stretched it back and forth across the bog, fastening it to small stakes. This divided the field into rows. Each picker was given a row, and he was not allowed to change until it was finished.

At first it seemed great fun to get down on the ground and strip off the bright berries, but when one does this day after day it gets pretty tiresome. It must be

easy to pick oranges, because you can stand up while you work.

Father paid the pickers fifteen cents a pail. It takes about three pailfuls to make a bushel. I averaged about one dollar and a half each day. I bought a suit of clothes and all my books for the year, and have considerable money left. Some of the younger pickers did not earn very much. Twice during the picking season there was a sharp frost, but we saved the crop.

The government sends out a Weather Map every day. Our teacher gets one, and there is one tacked up in the post office every morning. These maps tell what kind of weather to expect, and during the picking season father watched them closely. When he saw that frost was likely to occur, he and the men opened the gates which hold back the water, in order to flood the part of the bog where we had not picked. The vines were buried nearly two feet beneath the surface of the water. Father says the water cools so slowly that its temperature is much above that of the surface of the ground or the air near it, so the berries do not get frost-bitten. Soon after sunrise the water was drawn off, and the next day the bog was dry enough for the pickers to work.

I wonder if the Weather Bureau is of any use to farmers in California. I know that the sailors watch for the flags which tell when storms are coming, that they may not go to sea if a violent storm is expected. Father says very many lives and much property are saved every year in this way.

I have not told you what we do with the cranberries after they are picked. Of course we cannot help

gathering some leaves and twigs with the berries, and these must be taken out. For this purpose the berries are put into a *winnowing* machine. As the man turns the crank, wooden fans within turn rapidly, blowing out the leaves, twigs, and dirt. The berries drop through a screen and run out of a spout into a barrel.

A Cranberry Bog in Nova Scotia

What use is made of the parallel strings that are tied to the stakes?

We then put them into crates or barrels for sale. Father tells me that cranberries are shipped from our country to Europe, because those raised here are much better than the European berries.

Great quantities of cranberries are raised in this part of Massachusetts. I have been reading lately that

they are produced in New Jersey, on Long Island, and in Michigan, Wisconsin, Minnesota, Canada, and some other sections. From what I have read, I suppose they are not raised in southern California. Wouldn't it seem strange if you were to eat berries grown in our bog, three thousand miles away?

Now I want you to tell me about the orange groves of southern California, for none of us has ever seen an orange growing.

I wish you all a very Merry Christmas and a Happy New Year.

Ever your friend,

WILL

On a map locate Frank's home.

On what kind of land are cranberries grown?

Why are so many children employed in the cranberry industry?

How does the Weather Bureau Service help the cranberry growers?

Why does water keep the crop from being injured by frost?

Locate the chief cranberry-producing states.

THE COCONUT ISLANDS OF THE PACIFIC

Imagine yourself on a great ocean steamship, gliding over the blue water of the Pacific Ocean toward the Samoan Islands. Among the first things that you will see as you near the shores of these islands will be tall, slender, graceful trees, rising without a branch to a height of thirty to eighty feet. At the top is a sort of crown, composed of long, drooping leaves. These beautiful trees lean out over the water and toss their leaves in the strong and steady breeze from the ocean. They seem to nod a friendly greeting to you as you approach, and to wave a loving farewell to you as you sail away. These trees are the *coconut palms.* They grow on all of the tropical islands of the Pacific Ocean, in the West Indies, and along the shores of most warm countries, but never far from the sea.

When a coconut falls into the water, it is rocked and tossed by the waves and drifted about by the currents, but it is safe within its shell, for the salt water cannot penetrate this. When it finally comes to rest upon some strange shore, it is ready to give to the world another coconut palm, if the climate is like that from which it sailed. In this way nature has helped the trees to become widely distributed.

There are coconut *plantations* as well as wild groves of the trees. When a plantation is to be established, the planter selects the ripest nuts and dries them for

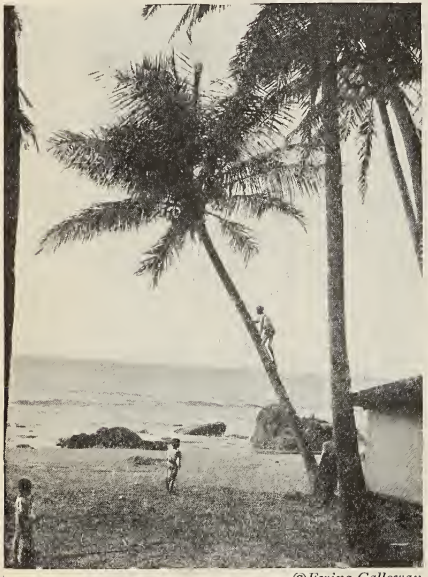
several weeks. They are then planted, and by and by a little palm springs from the small end of the nut and the roots from the large end. When the young trees are from six months to two years old, they are trans-

A Coconut Grove in the Philippines

planted in rows thirty or forty feet apart. They begin to bear nuts in about five years, but they do not yield a full crop for fifteen or twenty years. Do you think

that a poor man could afford to go into the business of coconut growing?

Coconuts grow in clusters. You notice also that they grow close to the stem instead of at the ends of the branches. They do not all ripen at once, but nuts may be picked at almost any time. A tree will produce from fifty to one hundred nuts each year. If you were to go into an apple, a peach, or a cherry orchard, you could easily pick the ripe fruit. Gathering coconuts is quite a different matter, however. Let us observe this shiny-skinned Samoan boy and see how he picks them. He fastens a short piece of rope in the form of a loop to each foot. Letting one of the loops catch on a rough place on the bark of the tree he places the hollow of his foot against it, clasps the trunk with his hands, and raises himself a little. Then the other loop is fastened a little higher up, and



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Climbing a Tree for Coconuts

he raises himself again. In this way he finally reaches the nuts. With a knife he cuts off the ripe ones, which fall to the ground and are piled up. They are then placed in baskets which are hung from a pole and carried on the shoulders of two men or are loaded on to donkeys and taken to the shed.

Opening Coconuts to Extract the Meat

The ripe coconut is a valuable article of food just as it is picked from the tree. It contains also a milk which is a nourishing drink. Most of the coconut sent to other countries, however, is in a form known as *copra.*

At the shed the hard shell, which covers the meat,

is split open by means of an ax or a knife. The meat is removed with a knife and is then spread out on mats to dry. This dried coconut is copra.

The inhabitants of these coconut islands live in a much more simple style than we do, and the coconut tree supplies many of the things that they use daily.

Let us examine the home of a native Samoan. The frame and posts of the house are made of the slender trunks of the coconut palm, while the roof is covered with its leaves instead of with shingles. The cups, bowls, dippers, and many other household utensils are made of the shells. If a whole shell is wanted, the "eyes" are pushed in, the milk is used, and ants are allowed to eat the meat. The shells make excellent water bottles. Baskets, curtains, and twine are made from the fiber of the leaves, and the bark is used for fuel.

From the copra an oil is pressed which is used in the manufacture of soap. It makes a perfectly white soap that will float. It is also used to furnish light, and people rub it on their bodies to prevent sunburn. The sap of the tree is made into sugar, vinegar, and a liquor.

While in our country the coconut is important chiefly to bakers and confectioners, in these far-away islands it is the most useful of plants and one of the chief articles of food. Would you not like to visit these islands and learn more of their interesting people?

On a globe locate the Samoan Islands.
Describe a coconut palm tree.
How is a coconut plantation started?
Why is it difficult to gather coconuts?
Why are the coconut groves so valuable to the people of the Samoan Islands?

A BUNCH OF BANANAS

Every day, as you walk along the streets, you see great bunches of bananas hanging in front of fruit and grocery stores. You find them at the corner fruit stand, and fruit vendors carry them from house to house.

Although bananas are now so plentiful and so cheap that all can afford to eat them, this was not so when your grandparents were children. In those days the fruit was regarded as quite a luxury, for there were few people engaged in carrying it from its tropical home to the cities of our country. Now many small but swift ships, called *fruiters*, carry on this business. They get their cargoes of fruit in the West Indies or Central America, and within a week after sailing they are unloading at New Orleans, Baltimore, New York, Boston, or some other Atlantic port. If the number of bananas which reach our country each year were equally distributed among the people of our land, each person would receive about fifty.

Let us get aboard that wonderful train upon which all may travel free of cost, which runs equally well upon land and water. We step off right in the center of a banana plantation on the island of Jamaica.

Yes, these are banana trees all about you. See how long and broad the leaves are and how gracefully they droop! Some of them are ten or twelve feet long. The trees, you see, are simply stalks from which the leaves

unroll. Here you can see some just starting out. They are rolls of bright green, pointing upward, each starting from the center of the stalk. No, the leaves were not

Courtesy of United Fruit Company

A New Banana Plantation

These plants are between three and four months old.

torn in that way by the pickers. The wind sometimes whips them into ribbons, for they are very tender.

These stalks growing from the base of the main

stem are called *suckers* here; in Costa Rica they are called *bits*. You remember that there are no seeds in bananas. It is these suckers that are planted when a farmer wants to start a plantation. They are set out

Courtesy of United Fruit Company

An Old Banana Plantation

From the height of the men in the picture, what do you estimate to be the height of these trees?

when two or three feet high and within a year they bear fruit. What did I tell you about the length of time required for the coconut to bear?

It is but four years since the trees in this plantation were single suckers, standing about fifteen feet apart. Now there are several stalks grouped about each parent plant, and the beautiful leaves, touching overhead, form shaded aisles of green.

Courtesy of United Fruit Company

Hauling Bananas from the Plantation

Notice the track along which this car is drawn.

Of course a great number of suckers are not allowed to grow together. Keeping these cut down is called *cleaning the plantation.*

Now let us examine the fruit on this tree beside us.

You see that the great cluster or bunch is made up of smaller bunches. These are called *hands*, and each banana is spoken of as a *finger*. Let us count the hands in this bunch. This is an unusually large one, for it contains thirteen. Nine hands make a *full bunch*. As you see, there are from ten to twenty fingers in a hand. Buyers will seldom take bunches of less than six hands.

Courtesy of United Fruit Company

Many Carloads of Bananas at a Railroad Awaiting Shipment

Here come the fruit cutters to help get a cargo for the fruiter we saw at anchor.

Yes, the bananas are green, I know, and they are always green when gathered. They will ripen in the storehouses when they reach the United States.

No, it is not a waste to cut down the stalks, for they

die after bearing their fruit, and the smaller stalks about them will soon yield. Some of these stalks, you see, have but one bunch and some have two or three. How odd the bunches look with the fingers all pointing upward!

Courtesy of United Fruit Company

Loading Bananas on Board a United Fruit Company Vessel
Try to tell how the loading machinery works.

The banana leaves which the men are wrapping about the bunches are to protect the fruit. It bruises very easily and great quantities are lost on this account. They are not always wrapped, however.

When the fruit reaches the vessel, it is carefully inspected; and if not in just the right condition, it is refused. The bunches which are accepted are taken into the hold of the ship and packed closely together. The planter receives for his crop only a small part of what we pay when we buy bananas. Why is this?

The men will not stop work until the ship is loaded. It may take twenty-four hours, and it may take twice that long, for a fruiter will carry from fifteen to twenty thousand bunches of fruit.

In some parts of Central America, where there are no harbors, the planters float the fruit down the streams in canoes. The vessels anchor at some distance from the shore, and the bananas are taken out in boats called *dories*. They are hoisted up to the deck of the ship by means of pulleys, and then packed in the hold. The thousands of bunches which are bruised in handling are thrown into the sea.

While the northern ports get most of their supply of bananas from the West Indies, the Pacific coast states are supplied from Central America. The fruiters unload at New Orleans into trains which carry the fruit to Los Angeles, San Francisco, and other places. Banana trains also run from New Orleans to St. Louis, Chicago, and other parts of the country.

The fruit ships have great pipes or *ventilators*, which carry the cool, fresh air from the sea down into the hold. Many of them also have *refrigerating plants* which keep the bananas cool in all kinds of weather. Sometimes when they reach port it is so cold that the bananas cannot be taken out for a few days. Trucks are loaded with the fruit at the wharves, and it is

taken to warehouses, where it gradually turns yellow. I am sure you have seen loads of the green fruit on the streets.

When the wholesale merchant sells the fruit, he often encloses each bunch in the rough material of which gunny sacks are made, and then puts a light, circular frame, made of strips of wood, over it. This, you see, protects the bananas. The grocer or fruit man takes hold of the frame without danger of mashing the fruit, lifts the bunch, and hangs it upon a hook. The frame and sacking are then removed.

Bananas grow in the tropical parts of Asia and Africa and on many of the islands of the Pacific Ocean, as well as in the West Indies and Central America. They are also grown in Florida, and they ripen in sheltered places in southern California.

You have seen both yellow and red bananas. The red ones usually bring the higher price, but they do not keep well and are not so extensively grown as the yellow ones.

The banana is an important article of food. It is much more nourishing than potatoes or even good, white bread. A flour or meal can be made from the fruit by drying it and then grinding.

Where do bananas grow?
How are they brought to our country?
Describe a banana tree.
Tell how a banana plantation is started.
How is the fruit prepared for market?
In what kind of boats is the fruit shipped?
What do you think the most interesting thing about the way the banana grows?

HOW DATES GROW

Three thousand years before the shepherds followed the star to the manger at Bethlehem, the beautiful date palm was cultivated beside the banks of the Euphrates and the Nile rivers. The date was the bread of the people who lived in these fertile valleys, and it is an important article of food in northern Africa, Arabia, and Persia to-day.

Look at a map of northern Africa, and you will see that the Great Desert, or Sahara, covers a large part of it. Here and there across the drifting sands wind caravan routes, traveled by camels ridden by strangely dressed men. These routes lead to beautiful garden spots called *oases*. Here are wells and springs, with little streams flowing in the shade of fig, date palm, and other trees. The people who dwell within these groves beside the cooling waters look out upon the desert as the inhabitants of an island might look upon the boundless sea. Find some of these oases and learn why they are fertile. The people who live in them depend upon dates for their living. The dreary journey from the coast to the interior is made to procure quantities of this fruit, which are wanted by the outside world.

If you were to make a journey in a desert country, you would find that you could not carry such articles of food as you would have if you remained at home.

The sunshine beats down fiercely, the springs and wells are far apart, and the patient animals must not be overloaded. The chief article of food carried is the date. A mass is packed together until it is so hard that pieces are chopped off with a hatchet when they are wanted.

Like the coconut palm, the date palm rises to a great height, sometimes fifty or sixty feet, without branches. It ends in a crown of beautiful feathery leaves which droop downward. These leaves may be ten or fifteen feet long. Many of them stand edgewise. Unlike most trees, the trunk does not steadily increase in size, and you can tell nothing as to the age of the tree by its diameter.

In its wild state many shoots spring from the base of the tree. These may grow as high as the parent stalk, so that in time a jungle or thicket is formed.

The flowers, which are clear white, grow in clusters. There are from six to twenty of these clusters on a tree, each of which produces a bunch of dates.

There are from ten to fifteen pounds of dates in a bunch. A tree will average from one hundred to two hundred pounds each year, although trees have been known to yield six hundred pounds. The trees yield when from four to eight years old, and continue to bear for a century.

The dates are green at first; later in the year they are a yellowish brown; when ripe, they are amber or black in color.

The trees require a very dry, hot climate, but moist soil. Long, long ago, this saying was common among the Arabs, "The date palm, the queen of trees, must

©*Ewing Galloway*

Gathering Dates in Spain

Instead of steel "climbers" such as linemen use in climbing poles, these men use a rope, which they move upward by little jerks without allowing their feet to slip.

have her feet in running water and her head in the burning sky."

Although there are lovely date palm trees on the grounds of many California homes, few of them bear fruit. The temperature must average from eighty to ninety degrees for a considerable time in the summer in order to mature it. What is the average summer temperature in your locality?

If an ordinary tree is frost-bitten, it recovers and soon puts out a new growth; but if the crown of the date palm be frozen, the tree dies.

When the Moors went to Spain, in the eleventh century, they introduced this valuable tree. Several hundred years later the mission fathers brought it to Mexico and to southern California.

How would you like to try to climb a date palm tree? Although they look so smooth and are without branches, the natives of the desert climb them without any help whatever. The trunk is always somewhat rough, which makes it possible to ascend them.

Not all of the dates in a bunch ripen at once, so they are usually picked by hand and only the ripe ones selected. Sometimes, however, the bunches are cut off. Some dates contain so much sap that the bunches must be hung up to allow it to drain off before they can be shipped. This sap is called *date honey*, and is saved. Dates are sent to the coast towns in bags or boxes called *frails*. Where dates are to be sold in small quantities, they are repacked in the small boxes such as you have seen.

You know that dates are very sweet. They contain from fifty-five to sixty per cent of sugar.

The trees are often tapped, and the sap which flows out is made into sugar. Vinegar and a liquor called *arrack* are also made from it. The leaves of the tree are made into bags and mats; from the stones of the fruit a drink is made which takes the place of coffee. From the leafstalks baskets are made, while the trunk furnishes material for houses and for fences.

If the dates could speak, they could tell us many wonderful stories of the Far East, of the river boats on the Nile, of the drifting sands which come so close to the river's banks, and of the caravans creeping over the desert toward the green oases and then fading out of sight, bearing loads of this food to the countries where it is not produced.

Locate the lands where the date palm grows.
Describe an oasis.
Give an account of a journey across the Sahara.
How did the date palm get to California?
Describe a date palm tree.
How are dates prepared for market?
Why is the date palm tree valuable?

THE ORANGE GROVES OF SOUTHERN CALIFORNIA

PASADENA, CALIFORNIA, Jan. 4, 1923.

DEAR WILL: I was very glad to receive your letter, and much surprised to know that you are living on a farm. I am glad that you described the raising of cranberries, for I did not know much about it before. When I told my teacher about getting the letter, she asked me to read it in the geography class and to show the pictures. I asked our groceryman where he gets his cranberries, and found that some of them came from Wareham.

You are having cold weather now, I know. Is the skating good? I have not seen ice as thick as window glass since we came to California, except that delivered by the iceman. Just now there is a beautiful covering of snow on the mountains a few miles north and east of town. Just think of picking roses and callas with snow in plain sight! The snow never remains more than a day or two on these mountains.

Soon after we came to Pasadena, father bought an orange grove of twenty-five acres. We are picking the fruit now. People began to pick oranges several weeks ago, and the work will continue all winter.

Orange trees are planted about twenty feet apart, but the groves do not look as apple orchards do in the East, for no grass is allowed to grow in them.

The best orange section is east of here, near Redlands and Riverside, but some good fruit is grown near Pasadena also.

Father keeps our trees pruned down rather low, so that it is easier to pick the oranges than it would be if the trees were allowed to grow very tall.

Courtesy of California Fruit Growers' Exchange

An Orange Grove in California

Orange growing is like cranberry growing in one way — the land must be irrigated in each case. Here the water is piped from the mountain streams and from tunnels. We form basins about ten feet square around

each tree and fill them with water. Most of our irrigating is done during the summer, as the winter is our rainy season. *You* would not call it a very rainy time. Our average is about twenty inches for the whole year.

The trees in our grove have been set out about six years, and they are bearing nicely now. Orange trees begin to bear when they are four years old; so, you see, we have to wait a little longer for a crop than you do for a crop of cranberries. It costs a good deal to start an orange grove. Trees cost from one dollar to one and one-half dollars each at the nurseries.

I wish that you could see the trees when they are in full blossom, and also when they are loaded with the golden fruit. I am going to put some orange blossoms into the envelope, but I am afraid they will not reach you in very good condition. They are very fragrant, and you can smell their perfume some distance from a tree in blossom.

To-day we picked about two hundred fifty boxes of oranges. We always speak of *picking* them, although they are not picked, but cut. You see, if they were picked off, the part where the stem pulled off would soon begin to decay.

We take a truck load of fruit boxes, and, while father drives slowly between the rows of trees, I throw them off.

Each picker carries a sack slung over one shoulder, and as fast as he cuts off an orange, he drops it into the sack. The sacks are emptied into the boxes, and these are loaded on to the wagon. A good picker will gather about forty boxes in a day. Three of these boxes are required to make two packed boxes.

Courtesy of California Fruit Growers' Exchange

Picking Oranges

Oranges are cut, never pulled from the trees. Pickers wear gloves to protect the fruit as they handle it.

We sell most of our oranges to fruit companies. These companies pack and ship the fruit. At the packing houses the oranges are placed in tubs of water and scrubbed with small brushes. Many women, girls, and boys work at this. The washing is to take off dirt and *scale*.

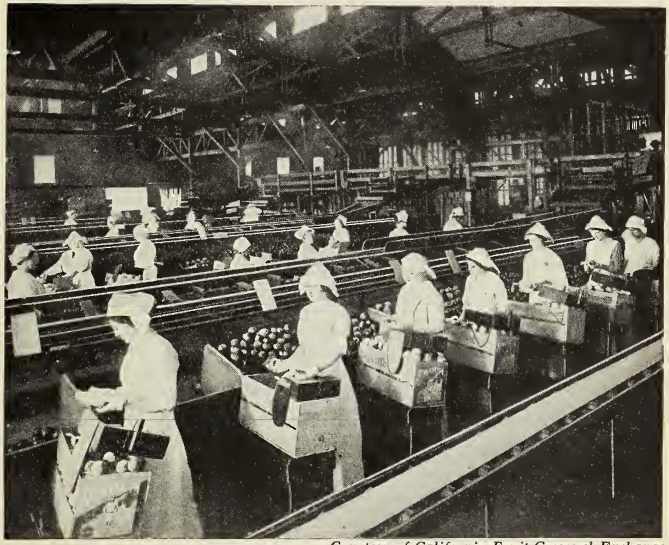
After the oranges are washed, they are placed in a sort of trough, which is highest at the end near the tub. They roll down this trough to the *grader*. This is a machine so arranged that the oranges pass through different openings according to their size, and come out sorted.

In the warehouse close by they are wrapped and packed. Chinamen often do this work. Each orange is wrapped in a separate piece of paper, which has the brand of the company stamped upon it. It is then packed firmly in a box. A certain number of oranges of each grade fill a box, ninety-six of the largest grade and about two hundred of the smallest. Those which are too small, as well as the imperfect oranges, are rejected. These are called *culls*. Sometimes these are sold for a low price, and sometimes they are thrown away by truck loads.

After the boxes are filled, they are placed in special fruit cars and hurried to St. Louis, Chicago, New York, Boston, and other cities.

Yes, the Weather Bureau is of great help to fruit growers. Of course we have very little winter here, but oranges will not endure much cold. The mercury falls below the freezing point but a few times each season. On New Year's Day the temperature here was fifty-eight degrees. I looked up the Boston tempera-

ture for the same day and found that it was only four degrees above zero. When the Bureau predicts a sharp freeze, the growers protect their trees and fruit by means of heating plants. Scattered through the groves are small heaters in which oil or gas is burned. Generally only a little heat is needed.



Courtesy of California Fruit Growers' Exchange

Grading and Packing Oranges

Explain how these racks sort the oranges by size.

Growers have to *spray* or *fumigate* the trees to destroy the scale that I spoke of, which is a great enemy of the orange, to kill the insects, and to wash off dirt. This is sometimes done by putting a great piece of

canvas over the tree, forming a sort of tent which prevents the fumes from escaping. It was found that the ladybugs would eat a pest called *aphis*, so they were brought into California from the East. They do a great deal of good, but we have to fumigate the trees.

Orange trees are raised from the seed, and the trees produced in this way are called *seedlings*. By *budding*, a fruit much better than the oranges grown on the seedling tree has been produced. There were five acres of seedlings in our grove, and father budded the trees. He cut off the limbs rather close to the trunk of the tree. Then he slipped buds from *navel* trees into cuts made through the bark in the end of each limb left on the tree. He then wound cord tightly about the limb and put on some wax. After a time a new growth started out where these buds were placed. These new branches will bear improved fruit.

We have a very fine variety of oranges called Washington Navels. Trees of this variety were obtained by our government from Brazil. Two of these were brought to Riverside, a town about seventy-five miles east of Pasadena, and planted on a ranch belonging to a Mr. Tibbitts. They did well, and all the trees of this variety in southern California were obtained from these two through budding. These trees are still living. One of them stands at the head of Magnolia Avenue. It is customary to send a part of the fruit of this tree each year to the President of the United States.

California and Florida are the two important orange-growing states of our country. Father says the industry is much older in Florida than in our state. Florida growers can ship their fruit to market much more

cheaply than we can. It costs us about one dollar for each box.

Mexico, the West Indies, Italy, southern France, and Spain are also orange producers. These countries have the advantage of cheap labor, father says.

I wish that you could visit us. We would have fine times, I am sure.

The next time I write I will tell you about some of the other fruits grown in California.

Your sincere friend,

FRANK

Why are the orange trees in California irrigated in the summer? Tell how the irrigating is done.

How are oranges gathered and prepared for market?

Of what value to the orange growers is the Weather Bureau Service?

How do the growers protect their trees against frost?

Why are orange trees fumigated? Tell how this is done.

How are different varieties of oranges produced?

Locate the parts of the world where oranges are grown.

A VISIT TO A VINEYARD

PASADENA, CALIFORNIA, Oct. 1, 1922.

DEAR WILL: Last week father went to Fresno, which is about three hundred miles north of here, in the San Joaquin Valley. He took me with him, and we visited some of the great vineyards and raisin-packing establishments near and in that city.

Raisins are simply dried grapes. Although there are many countries where grapes grow, there are few where raisins are made. Dew, fog, and rain injure the fruit, so that the San Joaquin Valley, with its dry, hot atmosphere, is well adapted to this industry.

There are a great many different kinds of grapes, but only the green varieties are used in making raisins. The chief raisin grapes are *muscats* and *Thompson's Seedless*. If the grapes are left on the vines long enough, they become raisins. I have picked some pretty good raisins from the vines. Of course, they dry more quickly and evenly when they are spread out.

The sugar that you find on and in the raisins is not put there by the people who dry the grapes. It comes from the juice of the grape.

Grapevines grow from both roots and cuttings. Of course cuttings are the cheaper. Often they may be had for the asking. Many think that it is better to set out rooted vines than cuttings.

Courtesy of California Associated Raisin Co.

A Raisin Vineyard in the Springtime

They are planted in rows from six feet to twelve or fifteen feet apart. During the first year the young vines will grow several feet. In the fall, when the flow of the sap has been checked by frost, the vines are pruned. A vineyard in California looks quite different from one in the East. During the winter it is simply so many rows of stumps several inches in thickness and one or two feet high. During the summer the branches grow from these stumps and produce their beautiful clusters of grapes, only to be cut off in the fall or winter.

The trimmings are generally burned in the vineyard at the same time that they are cut off. A sort of furnace made of sheet iron is fastened between two wheels and drawn by horses up and down between the rows. A man pitches the cuttings into it, and they burn as it moves along.

In the early summer men go through the vineyards sprinkling a coating of sulphur on the vines. This is to prevent *mildew*, which damages the fruit very much.

During the last half of August and September the grapes are picked. Sometimes the harvest continues into October. Most of the grapes had been gathered when we visited the vineyards.

When the juice of the grapes is one fourth sugar, they are ready to pick. The grower generally tells the condition by the taste and color of the fruit, although there are instruments for determining the amount of sugar.

Like oranges, grapes are cut from the vines and not picked. We saw great companies of workmen going through the vineyards cutting off the beautiful clusters. These they placed on shallow wooden trays to dry. In

a week or two, when the upper side of the clusters is pretty well dried, the grapes are turned. We saw the workmen place an empty tray, upside down, over a filled one. Then, holding the two together, they turned them over, and the grapes dropped into the tray that had been placed on top.

Courtesy of California Associated Raisin Co.

A Raisin Vineyard in the Autumn

During this drying time the people watch the reports of the Weather Bureau. In some places flags are displayed when rain is expected. As a rule the grape season is over before the rains begin.

When the grapes are taken from the trays, they are placed in boxes holding about one hundred pounds

each. These are called *sweat boxes*. Here the driest grapes absorb some of the moisture from the others, and the mass becomes more uniform.

After the drying process has been finished, the stems are rather brittle. To make them softer and easier to

Courtesy of California Associated Raisin Co.

Drying Raisins

These raisins are being dried in large trays in a special drying yard. What are the men doing at the right?

handle, the grapes are next placed in a cool room and left there for a time.

After visiting some of the vineyards, we drove to

one of the great packing establishments in Fresno. These packing houses are nearly always in the cities and towns, because there help can be easily obtained. The packing house that we visited employs four hundred people, mostly girls and women.

The raisins are first placed on wooden or metal frames the size of a raisin box. These are called *forms*, and the packers are paid according to the number of forms filled. When these are filled, the raisins are carefully transferred to the boxes.

Courtesy of California Associated Raisin Co.

Packing Cluster Raisins

A box of raisins weighs twenty pounds, but half boxes and quarter boxes are put up also. A paper is placed on the bottom of each box, and over the raisins another is placed. On top of this there is a fancy paper on which the name of the packer is stamped. Raisins are also put up in small cartons.

In most establishments there are three grades of raisins, Imperial Clusters, London Layers, and the loose and imperfect stems.

Sometimes a second crop of grapes is gathered a little

later in the fall. Of course these do not dry so well because the days are shorter, it is cooler, and rains sometimes occur. On this account they are dipped in lye and then rinsed in water. The lye cracks the skin, so that the juice evaporates more quickly. These are called *Valencia* raisins. There is not a very good market for these, so people do not dip them so commonly now as they used to.

We saw the machine where the raisins are *stemmed.* They pass from a hopper into a space between two woven-wire cylinders. The inner one revolves within the other. In this way the raisins are broken from the stems. They are then run through a fanning mill which cleans them, and they are finally graded by passing through screens having openings of different sizes.

Most of the seedless raisins are made from seedless grapes, but there are machines for removing the seeds from the grapes which contain them.

The superintendent of the packing house said that nearly all the raisins that we import come from Spain, chiefly from the city of Malaga.

There are many other things that I should like to write about, but I must close now.

Your sincere friend,

FRANK

What is the difference between grapes and raisins?

Why is the San Joaquin Valley well adapted to the raisin industry?

What kinds of grapes are generally used for making raisins?

Tell all that you can about the care of a vineyard.

Describe what Frank saw at the packing house.

What other country produces raisins?

NUTTING

Have you ever gone into the woods on a beautiful autumn day? The bright, warm sunshine floods the earth where the trees are far apart and sifts down through the branches. All nature seems to invite you to lie down under a tree and dream. It was on such a day that Rip Van Winkle fell into his long sleep.

How pretty the trees look in their fall suits of yellow, crimson, red, and brown! What a rustling is made as your feet tread the carpet of leaves!

The breezes pass among the branches and whisper a message to the bright-colored leaves. They understand and obey. Singly, in groups, and in showers, they silently float downward. By night and by day they fall, but soon this carpet will be changed for one of white.

Listen! The leaves are not the only things that are falling. You can hear the *thump, thump* of nuts as they drop from their lofty perches in the walnut and hickory trees.

Sit down quietly on that log and you will soon see the busy nut gatherers. With their tails curled over their backs, they race up and down the trees or spring from branch to branch, carrying their precious burdens to their homes in the hollows of trunk or limb. Now one sits up straight, holding a nut between his paws and turning it slowly as he cracks and eats it. If he

sees you, he whisks out of sight, or scolds you from a safe place far above the ground.

When the winter winds are whistling through the leafless trees, and snows are drifting over the ground, these little nut gatherers feast to their hearts' content.

The squirrels do not gather all the nuts. Children and grown people enjoy nutting. When there are not enough nuts on the ground, the men and boys climb the trees to shake them off. Then everybody hunts among the leaves for the treasures.

Some of the most important nuts are walnuts, hickory nuts, hazelnuts, almonds, chestnuts, Brazil nuts, pecans, and peanuts.

Many of the hickory nuts fall out of their coverings bright and clean. Walnuts generally have to be *shucked*, and the juice stains the hands almost black.

As hazelnuts grow on bushes, they can be picked easily. They usually drop out of their burs after there have been a few frosts.

Many nuts are gathered in the woods, but in some places the trees are cultivated just as fruit trees are.

We usually eat nuts between meals, or as a dessert. They are not simply dainties, but are very valuable articles of food. In some countries the poor people depend upon them for food.

In almost any city of our country are to be found the nuts that I have mentioned, with perhaps several other kinds. These have come from different states, some from Canada, some from Brazil, and some from Spain.

I am sure you will enjoy gathering nuts of different kinds, so let us set out on a nutting expedition.

Describe the woods at nutting time.

Why do the squirrels gather nuts before they need to use them?

What are some of the most important nuts?

Read aloud the paragraph that tells about nuts as a food.

WALNUTS

The walnut tree is one of the most important of the nut-bearing trees. The black walnut tree grows in the woods in the cooler parts of our country. These trees were once numerous in the Middle West, but as the wood is very valuable, most of the trees have been cut. The nuts produced by these trees have very hard shells and are difficult to crack.

The English walnut is grown extensively in California. The wood of the tree is soft and has little value. The nuts have thin shells and are easily cracked.

English walnut trees are planted in rows just as are apple and other fruit trees. The roots and branches of walnut trees extend to such a distance from the trunks that they are planted about forty feet apart.

The walnut harvest begins about the first of October, and is a busy time. Men, women, boys, and girls may be seen in the groves, shaking the nuts from the trees, picking them up, and putting them into sacks.

The men shake the trees, and there is a shower of nuts to the earth. Do not go under the branches now unless you want to be pelted. A single tree has been known to yield three hundred pounds of nuts in a season.

When the trees have been given a good shaking, there are still some nuts clinging to the branches. These are obtained by shaking the limbs separately, by

means of long poles, to the ends of which wire hooks are fastened. As all the nuts do not ripen at the same time, the trees are sometimes gone over two or three times.

Now the boys, girls, and women go to work filling pails and baskets and emptying them into sacks, for they can do this work as well as men.

Courtesy of California Walnut Growers' Association

A Walnut Grove Showing the Method of Irrigation

Usually the nuts drop out of their covering, or *shuck*, when they strike the ground; but if they do not, the shuck must be removed. Sometimes the covering is cut off. If you handle the nuts with your bare hands, they will be stained almost black, and you will have to let the color wear off.

The days are bright and warm, and this sort of

nutting becomes rather tiresome before sundown. The work must be done, however, so each does his part cheerfully.

When the nuts have been gathered, they are taken to the shed or place where they are to be washed.

Courtesy of California Walnut Growers' Association

Walnuts and Walnut Leaves

Here they are poured into a large wire cylinder which revolves in a tank filled with water. The machine is turned by a horse walking round and round, or by machinery, and it both washes and grades the nuts.

Courtesy of California Walnut Growers' Association

Cleaning and Sacking Walnuts

What is the purpose of the trays in the foreground?

The smaller ones pass through the meshes in the wire and are called *second grade.* The larger ones are known as *first grade.*

When the walnuts come out of the washer, they are spread out on shallow, wooden trays to dry. Sometimes several thousand trays may be seen on one ranch. They are loaded on to a small car and pushed to the part of the field where they are wanted.

If there is no foggy or cloudy weather, they will dry in about five days, but if there is, it may take ten.

After the nuts are thoroughly dried, the trays are placed on the car and pushed to the *bleacher.* This is a large box made of tarred paper. It is placed over the trays, and a quantity of sulphur is burned in it. This is simply to whiten the shells, for they sell for a higher price when they are bleached. Sometimes the nuts are whitened by dipping them into a liquid preparation. Finally the walnuts are sacked and shipped to all parts of the United States.

Why are there few black walnut trees left in our country?
Where are English walnuts grown?
How do English walnuts differ from black walnuts?
Why are walnut trees planted far apart?
Why would you like to gather walnuts?
Describe how walnuts are prepared for market.
Read aloud the sentence that tells how long a time is required to dry walnuts.

CHESTNUTS

Let us go on a chestnutting expedition to the southern part of France. We can gather the nuts in many of the states of our own country, but the trip to a strange land will be enjoyed by all.

The chestnut trees, many of which are very old, spread their branches to great distances. The nuts, as you see, are inclosed in a *bur* or coat which covers the shell. There are generally two nuts in each bur.

When *you* eat chestnuts, you eat them as a sort of dainty, not as a regular article of food. This is not the case in the home of Jean, the boy who is helping his father fill those sacks. In his home, as in many homes in southern Europe, the nuts form one of the chief articles of daily food.

In the winter Jean sells the freshly roasted nuts on a street corner in the city of Lyons. He gets a good many pennies each noon from workmen and poor people generally, who use them for their midday meal. He sells several nuts for a cent.

This is not the only way in which they are eaten. Jean's mother boils them with celery and mashes them as we do potatoes. The nuts are also ground into a flour from which bread is made. They are often used in the dressing for fowls.

Confectioners use great quantities of chestnuts. In Lyons there are establishments where as many as two hundred persons are employed in preparing them.

The nuts are first peeled, and then boiled in clear water, which removes the thin coating next the kernel. They are then placed in a sirup flavored with Mexican vanilla, in which they remain for about three days. After they are drained off, they are coated with vanilla or chocolate and packed in attractive boxes.

Name two countries in which chestnuts grow.
What kind of tree is the chestnut tree?
How does Jean earn money during the winter?
How does Jean's mother prepare chestnuts for the table?
Why do you think that many chestnuts are eaten in the city of Lyons?

A BAG OF PEANUTS

Last summer Harry's parents took him with them on a visit to Virginia. Harry has always lived in New York City, and the country life of the South was very interesting to him.

They visited friends who live on a beautiful *plantation*, as the farms in the South are called. A driveway lined with grand old trees leads through the flower-studded lawn up to the retired manor house, whose wide verandas completely encircle it.

Beyond the house are the stables where work horses, driving horses, and saddle horses are kept; and beyond these is the pretty little boathouse, standing on the bank of a small river that winds its way through the plantation.

The morning after Harry arrived, his friend Bert asked him if he would like to go across the river to see the men harvest peanuts.

Now whenever Harry had wanted peanuts, he had always gone to a stand and bought a sack. He had never thought about where they came from. He had heard of shaking nuts from trees, so he supposed that they were going to the woods.

He was therefore much surprised when Bert took him to a field across the river where men were plowing vines from the ground.

"Do peanuts grow in the ground?" he asked.

"Why, of course they do," answered Bert.

"I thought that nuts grew on trees," said Harry.

"Father says that the peanut is not a *real* nut," replied his friend. "He says they should be called *ground nuts* or *ground peas*." He pulled up one of the vines, and the boys threw themselves down under a tree to examine it.

Peanuts as They Grow

When the small clods of soil clinging to the roots of the plant had been removed, Harry saw a number of pods which he recognized as peanuts.

Opening one of the pods, Bert took out the kernels.

"These," said he, "are the *seeds*, and they are planted much as other seeds are.

"Before they are planted the shell must be removed, but we have to be careful not to break the thin skin that covers the kernel. If that is broken, the seed will not grow.

"The kernels are planted about one foot apart, in rows that are, as you see, about three feet apart. Sometimes they are planted by hand and sometimes by machinery."

"I wonder if peanuts are raised in the country around New York," said Harry.

"No, I think not," replied Bert, "for they are very easily killed by frost. Great quantities are raised in North Carolina and in Tennessee. Father says that the negroes of western Africa raised them long, long before they were known in the United States. He says that they are a very important article of food there, and that whole villages take part in the planting and harvesting.

"After the vines blossom," continued Bert, "a very strange thing happens."

"What is it?" asked Harry.

"The flower stalks bend downward and push themselves right into the soil, and on these the pods develop. If the stalks do not enter the earth within a few hours after the flowers fall, they die."

Harry now watched the plowing. The plows were drawn up and down the rows and ran directly under the vines, lifting them out of the soil. After they had been plowed out about two hours, men took them upon pitchforks and piled them up. Harry noticed that some of the piles were covered with corn fodder, and asked why this was. Bert told him that it was to keep out the rain.

"What happens to the nuts after the vines have been piled up?" said Harry.

"The vines remain in piles fifteen or twenty days, and are then spread out on the ground or hauled to the barn, where the nuts are picked off," answered Bert. "Sometimes they are picked by hand and sometimes by machinery. Let us go to the lower field; we have an earlier variety there, and the nuts are being picked now."

They found men, women, and children picking the pods one by one and dropping them into baskets. These were emptied into sacks. Harry tried to lift one of these and was surprised to find it so heavy. Bert told him that it weighed about one hundred pounds.

"Do you burn the vines after the nuts are picked?" asked Harry.

"No," said Bert, "they are fed to the cattle. We call the vines *peanut hay*."

Bert explained that his father sold the sacks of nuts to the factory, where they were cleaned and sorted.

The next day the boys went to town and visited the peanut factory.

The nuts were first put through a machine which removed the dirt. They were then polished and sorted into four grades. The poorest grade is used in making peanut candy. The nuts were then sacked, and were ready to be shipped to the North.

Harry learned that an oil is made from the nuts which is used as olive oil is used, and also that *peanut butter* is produced from them. He found that many men were employed on plantations all through Virginia and other states of the South, in growing the peanuts

that are sold on the streets of every city and town in our country.

Describe the plantation on which Bert lived.

What astonished Harry when he went to see the peanuts harvested?

Read aloud the sentence that tells why great care must be used in planting peanuts.

Name and locate the states in which peanuts are grown.

What strange thing do the blossoms do?

Describe the harvesting of peanuts.

Tell of the different ways in which peanuts are used.

ASSORTED NUTS

After the Thanksgiving dinner had been eaten, the nuts were passed, and the children asked Uncle John to tell them something about a few of them.

"All right," said he. "You pick out the ones that you want to know about."

Frank handed him an almond.

"This nut," said Uncle John, "came from sunny Spain. It grew not far from the blue Mediterranean. Almonds are raised in most parts of southern Europe and in the northern part of Africa. Ages ago they grew in the Holy Land, and are mentioned in the Bible."

"Do almonds grow in any part of our country?" asked Helen.

"I think they grow in California," said Frank.

"You are right," said Uncle John. "There are many almond orchards in the southern and central parts of the state.

"An almond tree in full bloom is a beautiful sight. The blossoms are white, tinted with pink, and as they appear before the leaves do, there is nothing to hide them."

"Does the nut have a covering?" inquired Mary.

"Yes," replied Uncle John. "When the nut is ripe, the shuck opens gradually, and sometimes the nuts fall out.

"When people have large orchards, they spread

Courtesy of Southern Pacific Company

An Almond Orchard in Full Bloom

pieces of canvas under the trees and then shake them or beat them by means of long poles.

"The nuts that do not fall out of the shucks are obtained by opening the shuck with a knife. The nuts are then dried, and are ready for market."

As soon as Uncle John had finished, Mary handed him a hazelnut. "Please tell about this one," said she.

"I have often gone hazelnutting when I was a boy," said her uncle. "Hazelnuts grow on bushes in thickets. The bushes are six or eight feet high and very slender. Baskets are sometimes made of them, and I have often used them for arrows.

"Sometimes the nuts grow singly, and sometimes in groups of two or three. A bur covers the nut, which sticks very closely until it is ripe. Then the nuts often fall out.

"After I had gathered the hazelnuts, I used to spread them out on the roof of the woodhouse to dry."

"Nuts that look just like these are called *filberts*," said Helen.

"Filberts are cultivated hazelnuts," replied Uncle John; "they are larger than the wild ones."

"I would like to know how this nut grows," said Helen, handing her uncle a black nut shaped like a triangular prism.

"This," said Uncle John, "came from Brazil, and is called a *Brazil nut*. Do you know where Brazil is?"

"It is in the northeastern part of South America," replied Helen.

"The great Amazon River is in Brazil, and it flows through tropical forests," said Mary.

"Much of our coffee comes from Brazil," said Frank.

Uncle John then told the children that Brazil nuts come from the northern part of Brazil and from the Orinoco Valley.

Helen asked if they grow as walnuts and hickory nuts do.

"No," answered her uncle, "they grow inside of a great case or shell. There are from eighteen to twenty-five in one shell, which is nearly as large as a man's head."

"How are the nuts got out of the shells?" asked Mary.

"When they fall, men break them open and take out the nuts," replied Uncle John. "Most of them are sent down the Amazon to the city of Para and from there shipped to the United States and other countries."

None of the children knew where Para is situated, so they all went to the library to look at the atlas. After they had located it, Uncle John told them of his visit to the city and of the wonderful things which he saw on a steamboat trip up the Amazon River.

Name and locate some of the places where almonds grow.
How are almonds harvested?
How do hazelnuts grow?
Locate the country in which the Brazil nut grows.
What do you think the most interesting thing about Brazil nuts?

A STRANGE CONVERSATION

One evening after I had been reading for some time, I went to the kitchen to get a drink of water. That part of the house was dark and quiet, and as I stepped through the doorway I heard low, musical voices, apparently in the pantry. I was very much surprised, you may be sure, and I kept perfectly still, and listened.

"Yes," said a voice, which I could barely hear, "I am a long way from home indeed, and sometimes it makes me quite lonely when I think of it."

"Tell us about your home, and how you lived," said another low voice.

"Well," began the first speaker, "my name is *Pepper*. With twenty-five or thirty brothers and sisters I grew in a cluster on a vine. We were but a small part of the family, for there were similar clusters all over our vine. We were about as large as peas, and grew somewhat after the fashion of currants.

"All about were other vines to which friends and relatives were attached. Pepper vines are always anxious to get to the top, and so some of these vines climbed trees and some twined themselves about poles which men had set in the ground for this purpose. Our vine was three or four years old when we appeared on it."

"How long did you live on the vine?" asked a voice that I had not heard before.

"Only a few months," replied Pepper. "You see, we had to make room for another set of berries. Two sets appear each year for twenty years or more.

"Under the influence of the tropical sunshine and the warm rains we grew day by day, and we were as happy as the butterflies and birds about us. By and by we began to turn red. All of this time a *hull*, or coat, was forming on the outside of our bodies.

"Before we became entirely red, workmen came to the field, and, by rubbing us between their hands, separated us from the stems to which we lovingly clung.

"After having been picked, I was, with many others, placed upon a mat to dry. These mats were all about us, each covered with berries. After being thoroughly dried we were put into a mill and ground, and I became what I am now, *Black Pepper*."

"Are there other kinds of pepper?" asked some one.

"Oh, yes," said Pepper, "there are *White Pepper* and *Red*, or *Cayenne*, *Pepper*. Some of my friends were made into White Pepper. They were soaked in limewater for about two weeks, and this, of course, softened and wrinkled their hulls which had always fitted so nicely. This was bad enough, but it was not the worst."

"What happened next?" said several voices.

"They were then," continued Pepper, "trodden under the bare feet of dark-skinned men, and this rubbed off their hulls completely. After this they were ground as we had been.

"Cayenne Pepper is not a member of our family at

all, although it has the same name. I have looked up its family history, and I find that it received its name from the city of Cayenne, in French Guiana, near which it grows. It is in the form of bell-shaped pods, and grows on low, bushy plants instead of vines.

"The pods are green at first, but red when ripe. No doubt you have seen strings of them hanging in the grocery store when you were on the shelves. People sometimes use the pods as they are, but usually they are dried, ground, mixed with yeast, and baked into flat cakes like crackers. When these cakes are ground, Red, or Cayenne Pepper, is produced. It is put up in little boxes just as we are.

"Pepper used to be regarded as a great luxury," the speaker went on. "Until the eighteenth century the Portuguese handled almost all of it. It was not uncommon for rents to be paid with pepper. If any of you have read ancient history, you know that when Alaric took Rome he demanded, among other things, one thousand pounds of pepper as a ransom.

"My home was in the East Indies," said Pepper, "but there are members of our family living in the Philippines, India, Mexico, the West Indies, and other tropical countries."

"Your story is a very interesting one," said a voice, "and now, if you care to hear it, I will tell something of my life."

"Yes, do tell us," said several at once.

"Very well, I will follow the example of our friend Pepper and introduce myself at once. I am known as Ginger. I have relatives living in China, in India, and in the western part of Africa, but I came from the

West Indies. The Ginger family is not like that of Pepper; it has no lofty notions."

Pepper seemed a little inclined to get angry, so Ginger hastened to say: "I mean that our vines do not climb trees or poles, but run along the ground. I was a *root* and not a *fruit*."

Picking Peppers in Ceylon

Find Ceylon on your map of Asia.

"When I was about a year old I, with countless friends, was dug from the ground. We were cut from the vines and put into vats of scalding water."

"That was *dreadful*," said Pepper.

"We were treated in that way to prevent us from *sprouting*," continued Ginger. "After being taken out of the water we were thoroughly dried and then ground. We were then put up in cans and boxes and sold as *Black Ginger*. Others were scraped before being ground, and they were then called *White Ginger*.

"We were placed on board a great ship and finally landed at New York. After remaining in a large store there for some time, I was brought to the corner grocery, and so I found my way to this shelf.

"I am gradually wasting away, and I shall not last a great while longer. In my tropical home I seemed to be of no use to anybody, while now I am called for frequently by the cook, and my services seem to be appreciated, so I am happy."

"To be of some real use in this world is the greatest joy of life," remarked a strange voice.

There was silence for a moment, and then Ginger said, "May we not hear from you, friend?"

"Your stories almost make me believe that I am still in the land of my birth," was the reply.

There was a peculiar little rattle about the voice, which I recognized at once as belonging to Cinnamon.

"For several years I was rocked to and fro by gentle tropic breezes or lashed about by storms. From my perch I could see beautiful flowers, bright insects, and even serpents in the thicket at my feet. Birds of brilliant plumage often perched upon me. My home was on the island of Ceylon.

"It is often said that where there is much bark there is no bite. In my own case that is not so."

"I do not understand," said Ginger.

Stripping and Sorting Cinnamon Bark

"Why," said Cinnamon, laughing, "I am *all* bark, and I have considerable bite, as those who have tasted me know.

"I was taken from one of the smaller limbs of a cinnamon tree. I was slipped within a larger piece of bark, for we each rolled up when stripped from the limbs. A still larger piece was slipped over us and so on until quite a bundle had been formed. Some were quite short, and some were three feet in length.

"We were then gathered into packages and a sort of matting was sewed about us. In this form we were shipped to New York. In a great warehouse there I became acquainted with Cinnamon from Java, China, Egypt, and Brazil. From these friends I learned many interesting things about different parts of the world, which I may tell you some time."

Another voice now took up the conversation.

"We have heard from a fruit, a root, and a bark. I am none of these, but a flower not fully developed. I was one of the myriad buds that decorated a beautiful evergreen tree on an island in the Indian Ocean.

"Men call me *Clove* because I bear some resemblance to a little nail. The part of my body which looks like the head of a nail is formed by the petals which did not have a chance to open fully.

"When I was picked, I was just changing from a green to a red color. I was placed, with others of my kind, on a large cloth spread on the ground, and there we dried and hardened. As we dried, we became dark brown in color.

"Our family used to live on the Molucca Islands, but it has been scattered, and members are now found

in tropical Africa, in Brazil, in the West Indies, and elsewhere."

There was a slight stir as though some one else were preparing to speak, but just at that minute a door slammed, and in an instant all was still. I waited for some time, hoping to hear more of this interesting conversation; but not another word was spoken, so I hurried to the library and wrote all that I had heard.

Why was Pepper lonely? Tell his story, using your own words.
What is another name for red pepper?
Name and locate some of the countries from which pepper is obtained.
Where does ginger grow?
What part of the plant furnishes the ginger?
What made Ginger so happy?
From what part of the tree is cinnamon taken?
Name and locate the countries from which cloves are obtained.
From what part of the tree does the clove come?
Tell why the clove was so named.

DINING AWAY FROM HOME

When white people first came to this country, they lived in little groups called *settlements*. This they did for protection, because the country was inhabited by Indians. Each family had land and cultivated crops for food. They secured meat from the animals that lived in the forests, and fish from the ocean and from the streams. Wild berries were gathered in the summer and nuts in the autumn.

The people of those days did not depend upon others for food. Each family supplied its own needs. The cooking was done in the home and unless people were visiting, the meals were eaten at home.

When each family meets all of its needs, there is little time for recreation or improvement. Clothing must be made. Houses must be built and furnished. Fuel must be obtained. Physicians, lawyers, ministers, teachers, and other special workers are needed.

People began to divide their work. Those who were to manufacture things settled in towns. To these the raw products were sent. To-day the majority of people live in towns and cities. They therefore produce little food.

The people who live in the country grow grains, vegetables, and fruits, and raise poultry. Some have dairy farms, from which our milk and butter are obtained. On other farms cattle are raised.

The inhabitants of the country produce much of their own food. They cook and serve their meals in their own homes. In many cases bread, cakes, pies,

An Apartment House in New York City

vegetables, canned goods, fish, and fresh meats are secured from the cities.

Some city people have their own homes and some

have small gardens. But most of the city dwellers depend entirely upon others for their food. In cities land is very expensive, and only the wealthy can have their own gardens. This is one reason why there are tall buildings in cities.

In the country we find but one family in a house. In cities there are many *apartment houses*. A large number of families may occupy one of these houses. Each family has one or several rooms called an *apartment*. If an apartment is several stories above the street it is inconvenient to have food delivered. Disposing of the garbage each day is another difficulty. In some cases apartments are not supplied with kitchens. The mothers, as well as the fathers, often work outside of the home. Large numbers of unmarried people go to cities to secure employment. Most individuals who live alone do not do their own cooking.

For all these reasons there must be in cities hotels, restaurants, and cafeterias where those who do not keep house may get their meals. Some of these serve only a few people daily, but others serve several thousands. Many families serve meals to a few regular guests. In all cities there are people who live from year to year in hotels.

In a home the mother knows the number of persons for whom to provide. In a restaurant the number varies from meal to meal. Different people like different kinds of food. A large variety of foods must therefore be provided.

The names of the things that may be secured are printed upon a card. Usually the price is given. This list of foods is called the *menu*. The guests examine the

cards and give their orders to the *waiters*. Sometimes the order is written upon a sheet of paper prepared for the purpose.

Let us follow the waiter into the kitchen. It is a busy place, you may be sure. We find a large quantity of provisions on hand. These are added to daily by the

Dining in a Restaurant

buyer. There are refrigerators where fresh meat, fish, milk, butter, and fruits are kept. There are great stoves for cooking and baking, and ovens in which certain foods are kept hot. Soup, tea, and coffee are made in large quantities.

Potatoes are pared by machinery. Bread is cut in

the same way. Dishes are washed in large trays and dried in racks. All work is done in the quickest and least expensive manner.

Each waiter or waitress serves the guests at certain tables. When the orders have been filled they are taken to the dining room. Sometimes the bill is paid the waiter and sometimes the cashier receives the money.

In most cities there are *cafeterias*. In these the food is displayed upon long tables or counters, hot and ready to serve. The guests, arranged in lines, pass before these tables and select what they want. They are served by waiters. When the orders are completed the guests carry their trays to tables where they eat.

Many city people find restaurant life, especially in the evening, a form of entertainment. Friends often go together and talk while they enjoy their dinner. Music is furnished in many restaurants and cafeterias; when this is good it is an attraction.

To-day people travel much more than they used to. A journey may occupy several days, and of course the travelers must have food. Dining cars are now attached to railway trains that make long trips. When the meals are ready to be served, a man passes through the train and announces this.

In one part of each dining car there is a kitchen where meals are prepared. On either side of the dining car there are small tables. Waiters take the orders as they do in any restaurant. The car is in charge of a man known as the *dining car conductor*.

Our passenger steamships are provided with restaurants. The price of a ticket usually includes the

cost of room and meals. Great quantities of provisions are taken on board because some of the ships carry several thousand persons. Not all of the passengers can eat at one sitting. Each person is therefore assigned particular hours. He always sits at the same place.

A Dining Car

The kitchen is at one end of the car.

There are many ways in which country and city life differ. One of these has to do with producing, preparing, and serving food. How and where we are fed depends upon how and where we live.

Give several reasons why many city people do not eat at home.

Why are many kinds of food provided in hotels, restaurants, and cafeterias?

How does a cafeteria differ from a restaurant?

How are foods in a restaurant kept fresh?

In what ways is restaurant life enjoyed by many?

A DRINK OF WATER

One hot summer day Philip Brown was very thirsty. He went to the refrigerator to get a glass of ice water. He was greatly disappointed to find that there was none to be had. The water from the hydrant seemed so warm that he decided that he could not drink it. Just then Philip's mother appeared, so Philip asked her what could be done about it.

"For centuries people did not have ice water," said Mrs. Brown, "and even to-day there are many who are drinking much warmer water than that which you can obtain from the hydrant. In fact there are great numbers of boys who have never seen such a thing."

"How do they get water?" asked Philip.

"I will tell you," replied his mother. "Long, long ago people got thirsty just as they do to-day. As there were neither refrigerators nor hydrants and not even wells, they followed the example of the animals. When one wanted a drink he went to the nearest spring, stream, or lake and satisfied his thirst. In time they learned how to make cups and other utensils, using gourds, skins, clay, or grass.

"By and by men discovered that water could be obtained by digging into the earth. These holes were called *wells*. In the rural sections of our own and other countries there are many wells to-day."

"Are wells deep?" inquired Philip.

"Some are only a few feet deep and some are hundreds of feet deep," answered Mrs. Brown. "Formerly all wells were dug by hand. In order to keep them from caving in they were lined with stones or bricks. In some of the shallow wells boards were used. The deep wells are drilled by machinery. These are usually but a few inches in diameter. Many pipes are screwed together forming one long one. This extends to the bottom of the well."

"How do people get the water out of the wells?" asked Philip.

"In different ways," replied his mother. "One end of a rope may be tied to a pail. When water is wanted the pail is lowered into the well and filled. It is then drawn up by hand.

"Another simple method is to use a windlass. A floor is laid over the well in such a way as to leave an opening in the center. Over the opening a box-like form, open at top and bottom, is placed. A wooden cylinder, several inches in diameter, is fastened across the top of this. The cylinder is called a *windlass*. To one end of the windlass a handle, like an automobile crank, is attached. To lower the bucket into the well, the windlass is unwound. Winding it up raises the bucket of water to the top."

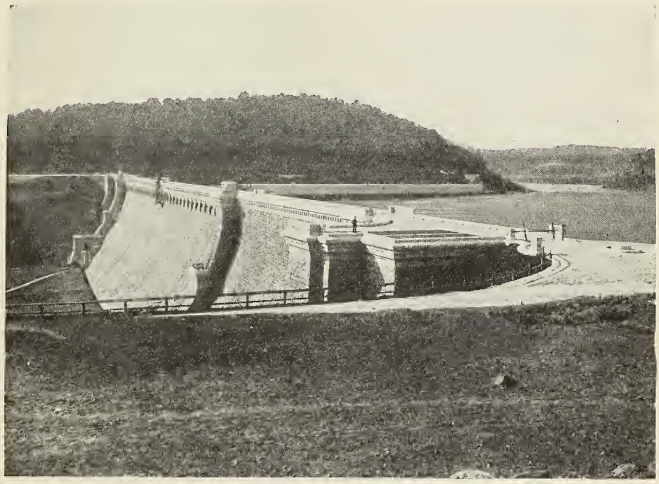
"Do people draw water from wells to-day by means of pails?" inquired Philip.

"Yes," replied his mother, "but in most cases pumps are used. Some pumps are worked by hand. Some are operated by the wind, some by gasoline, and some by electricity.

"In the country families usually obtain their water

supply from their own wells. This cannot be done in large cities. One reason is that the water would not be pure. Another reason is that many families live in each of the large apartment houses and hotels.

"The securing of a water supply for a large city is a great undertaking. Water is needed by the industrial



A Great Dam Which Helps to Give New York City Its Water Supply

plants and for sprinkling streets, flushing sewers, and putting out fires. It is, of course, very important to have pure water.

"As New York City grew it had to increase its water supply from time to time. In 1907 it became necessary to obtain water from the Catskill Mountains, ninety

miles from the city. A large force of men was employed for several years in developing the system."

"How do the people get the water?" asked Philip.

"It is carried in a great pipe called an *aqueduct*," answered his mother. "The water is stored in large reservoirs, so that should the pipe break there would be a supply on hand."

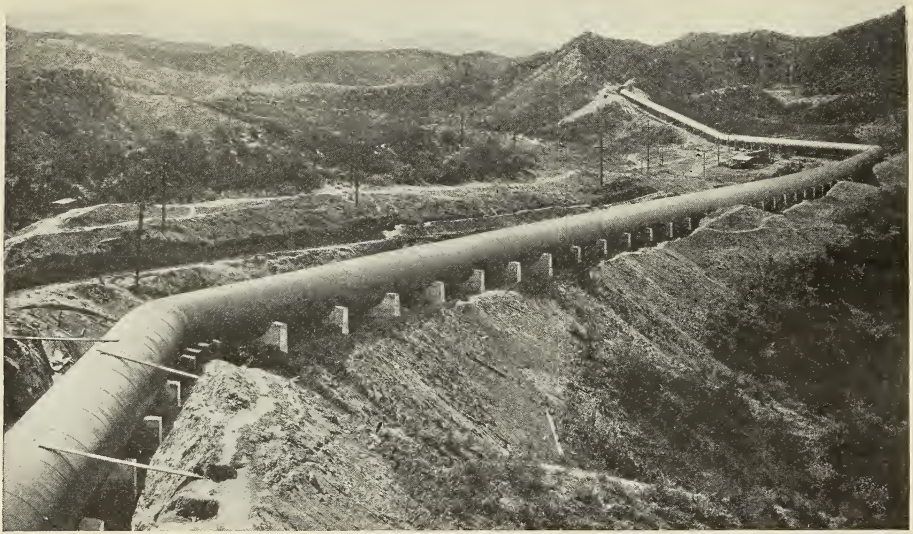
"Where does the water used in Chicago come from?" inquired Philip.

"It comes from Lake Michigan," replied Mrs. Brown. "In order to secure the lake water for use in the city a wonderful piece of work was done.

"Several tunnels were dug right under the bottom of the lake. These extend a few miles from shore. In the tunnels large water pipes are laid. From the farther ends of the tunnels the pipes extend up into the water. On the shore there are pumping plants which force the water to the buildings in all parts of the city.

"Now I will tell you about the water supply of one more large city," said Mrs. Brown. "Los Angeles, California, is situated in a part of our country where little rain falls. For many years it obtained water from the Los Angeles River and from wells. The city grew rapidly and it was seen that more water was needed.

"Far to the north of the city there are lofty mountains. Some of these are snow-capped all the year. The people of Los Angeles laid a great concrete aqueduct from Owens River to the city, a distance of about 200 miles. In some places the water is carried right under mountains by means of tunnels. The aqueduct



A Portion of the Great Aqueduct that Brings Water to Los Angeles from the Distant Mountain Streams

extends across many miles of desert. The work required much money and many men working for several years.

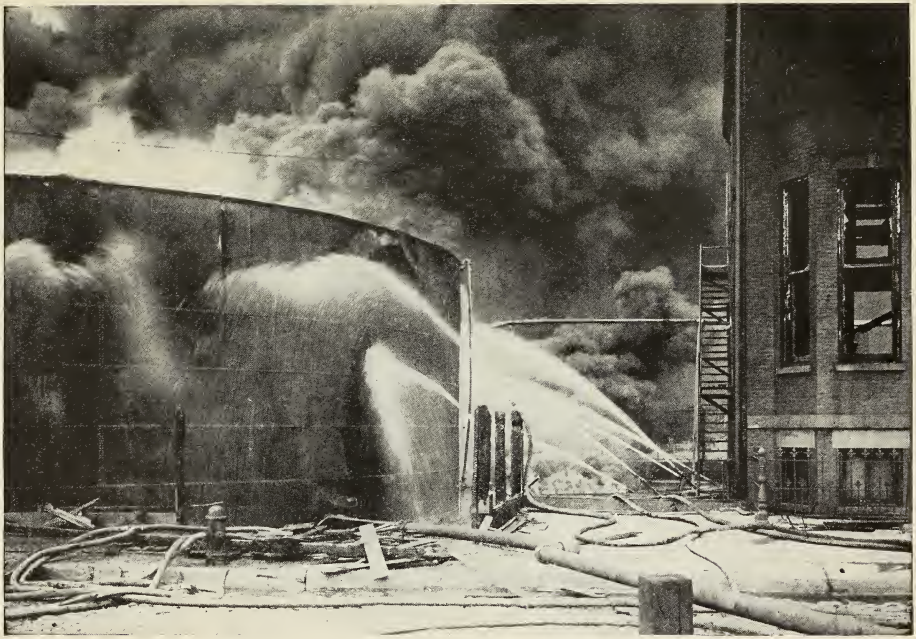
"Of course where a city furnishes water to its people the users must pay for it. Some use only a little water and some use a great deal. By means of a wonderful device called a *meter*, all of the water used in a given building is measured. Once each month the meters are read and the water bills sent to the consumers.

"All over the world the securing of a water supply is an important matter. We must have water to drink at very frequent intervals. Because of this we must have a supply close at hand. In cities much water is used in manufacturing and in other ways.

"Of course plants must have water. In many parts of the world the crops are watered by the rains. In other parts there is very little rainfall. In these dry or *arid* regions crops must be *irrigated.* Water is carried in open ditches or pipes from streams or lakes to the places where it is needed. As a result of irrigation very many people live and produce abundant crops in regions which are naturally too dry for farming.

"You know that the conservation of food is very important. Where there is little rain, no water should be wasted. In fact we should not waste water in any city. All of the water metered must be paid for. We can avoid unnecessary expense by always shutting off the water when it is not in use. Leaks both in and out of the house should be promptly reported.

"Man has done many wonderful things. One of these is to place before those who live in cities a supply of water. Wherever we are water is always close at



Water is one of the chief needs of man. Make a list of its uses.

hand. We go about our work or play knowing that when we want a drink we can turn a faucet and supply our need."

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In this ditch or flume water is being conveyed from mountain streams to a Western valley for irrigation purposes.

How did the people of long ago secure a water supply?

Describe the ways in which water is obtained from wells.

Why does it cost so much to secure a water supply for a large city?

Tell how Chicago gets its water.

What is irrigation?

How may water be saved?

Date Due			
EDUC FEB 23 '76			
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